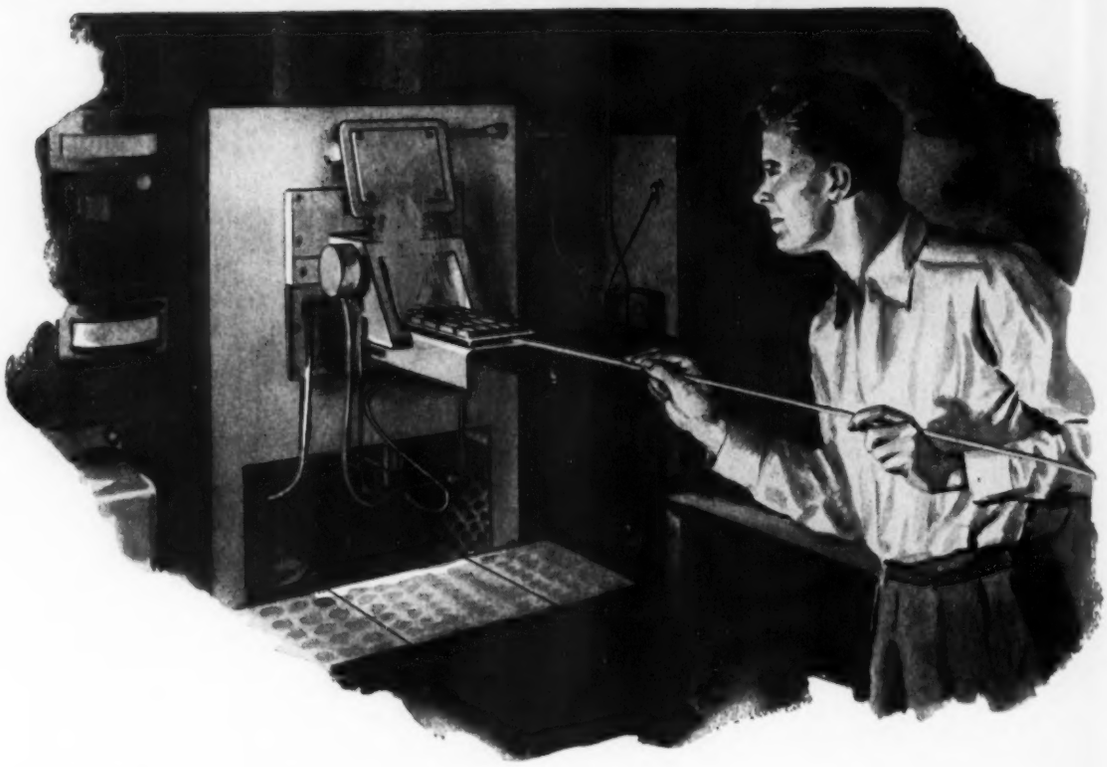
THE IRON AGE

THE NATIONAL METALWORKING WEEKLY December 7, 1950

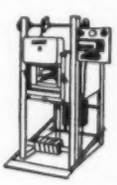


Dependable performance year after year with Hoskins Chromel -equipped Electric Furnaces

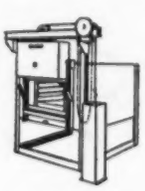
There's nothing revolutionary about Hoskins Furnaces, but you'll find them hard to beat when it comes to delivering useful electric heat. And for good reason, too. Because every Hoskins Electric Furnace is equipped with durable CHROMEL heating elements. Long-lasting elements that possess close-to-constant "hot" resistance between 700° and 2000°F., that deliver full-rated power throughout their long and useful life. Dependable heating elements designed to give you uniform distribution of heat with maximum operating efficiency. Important, too, every CHROMEL element in every Hoskins furnace is formed in such a way as to permit quick and easy replacement.

Take the Hoskins FK Brazing Furnace illustrated above, for example. Compactly designed for brazing small tools and parts, it's economical to operate... low in hydrogen and power consumption, quick on recovery. And it's equipped with heavy-duty reverse "U" type heating units made of long-lasting 1" by $\frac{3}{16}$" CHROMEL-A ribbon.

So next time you're in need of good dependable heating equipment, get the facts on Hoskins CHROMEL-equipped electric furnaces. Our Catalog-59R describes the line . . . want a copy?



TYPE FR-206, 207, 208 BOX FURNACE



TYPE FR-251 BOX FURNACE

TYPE OR-104 POT FURNACE

TYPE FR POT FURNACE

HOSKINS MANUFACTURING COMPANY

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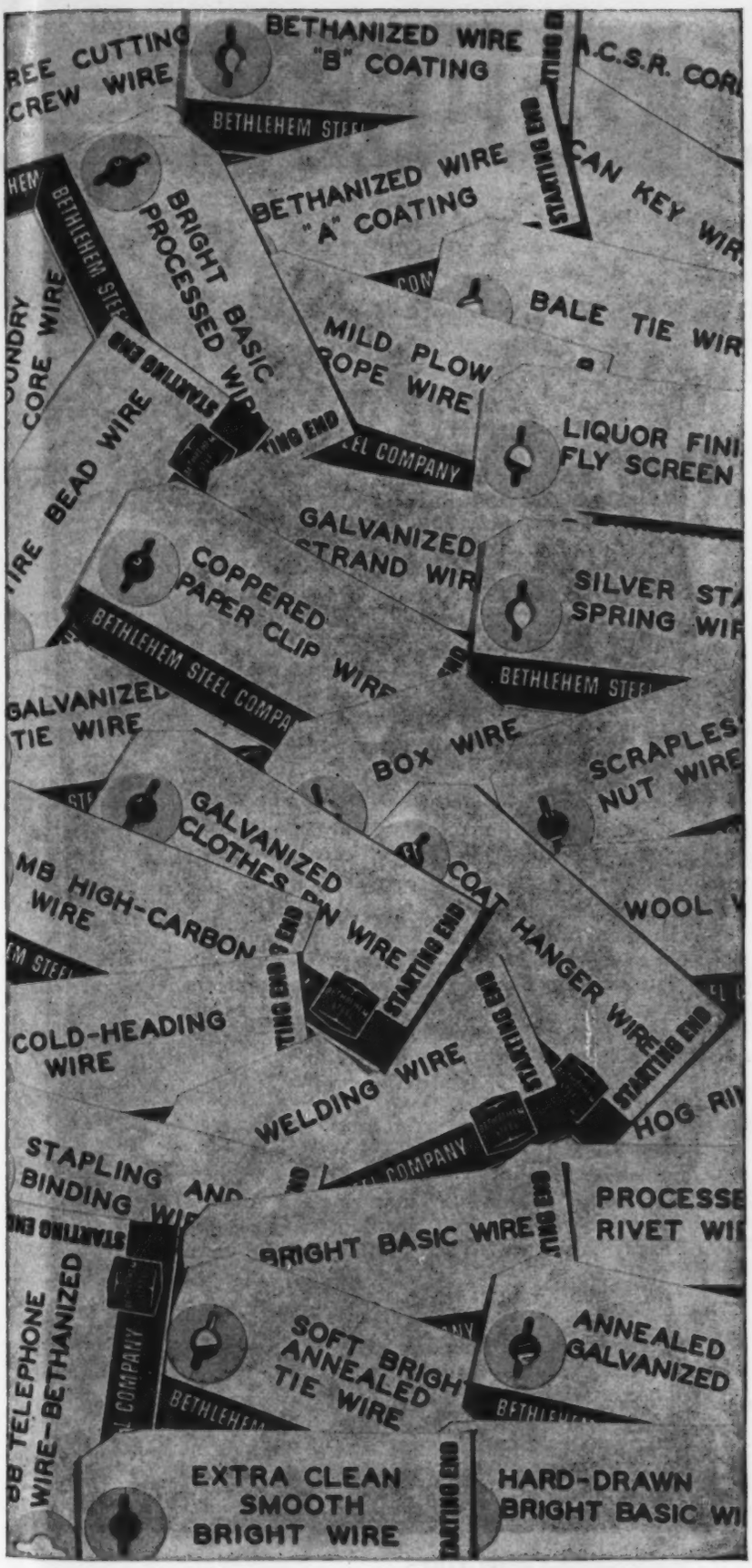
Chromel®

**the original nickel-chromium resistance alloy that first made electrical heating practical*



We make them all

Perhaps not one of these identification tags describes the kind of steel wire that's best for your requirements. Although there are countless applications for the common types of wire, more and more specialty grades are being used today. These have been developed with specific end uses in mind. They have properties that help wire processors to cut production costs and to improve the performance and sales appeal of wire products.

Your own uses may call for one of our standard grades or a special-purpose type of steel wire. Either way, you can count on our paying strict attention to the important details in turning out a top-quality product in our modern wire mills.

In just the past few years we have made real strides forward in perfecting various specialties in steel wire. Perhaps you'd be interested in some of these. Our engineers will be glad to contribute their experience to any problems you may have in the selection and processing of steel wire.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation.

BETHLEHEM WIRE

BETHLEHEM STEEL

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THE IRON AGE

CONTENTS

December 7, 1950 • • • Vol. 166, No. 23

Special Article

New super high-speed steels wear better and are tougher than cast alloys and carbides. Hot hardness is 20 to 30 pct higher than that of standard high-speed steels. Feeds can be twice as great as those used with standard high-speed steel tools.—p. 115.

Issue Highlights

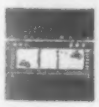
Tooling for aircraft production will benefit from a new, faster, more accurate construction method for assembly fixtures. The optical alignment method also has potential application in machine tool and other industries.—p. 119.

The effect of sigma on mechanical properties is great when metal is subject to prolonged exposure to high temperatures. Heat treatment can convert sigma to delta ferrite, but this may cause grain growth.—p. 127.

The steel industry is quickly falling into line with the pattern-setting agreement between U. S. Steel Corp. and the United Steelworkers of America calling for an average wage boost of 16¢ an hr. Other major producers also indicated they would match U. S. Steel's 5½ pct price increase which will average about $5.80 a ton.—p. 135.

Since the Reds have shown the iron curtain is portable, the Allies are taking a second look at West Germany's steel industry as a source for rearmament steel. A raw materials bottleneck is causing the industry trouble. The Allies however want export output increased.—p. 138.

In the aftermath of one of the heaviest snowstorms in Lower Lakes history, the 1950 ore season was tapering off this week. About 90 smaller ships are tied up now but the movement from Upper Lake ports will continue to Dec. 15.—p. 139.



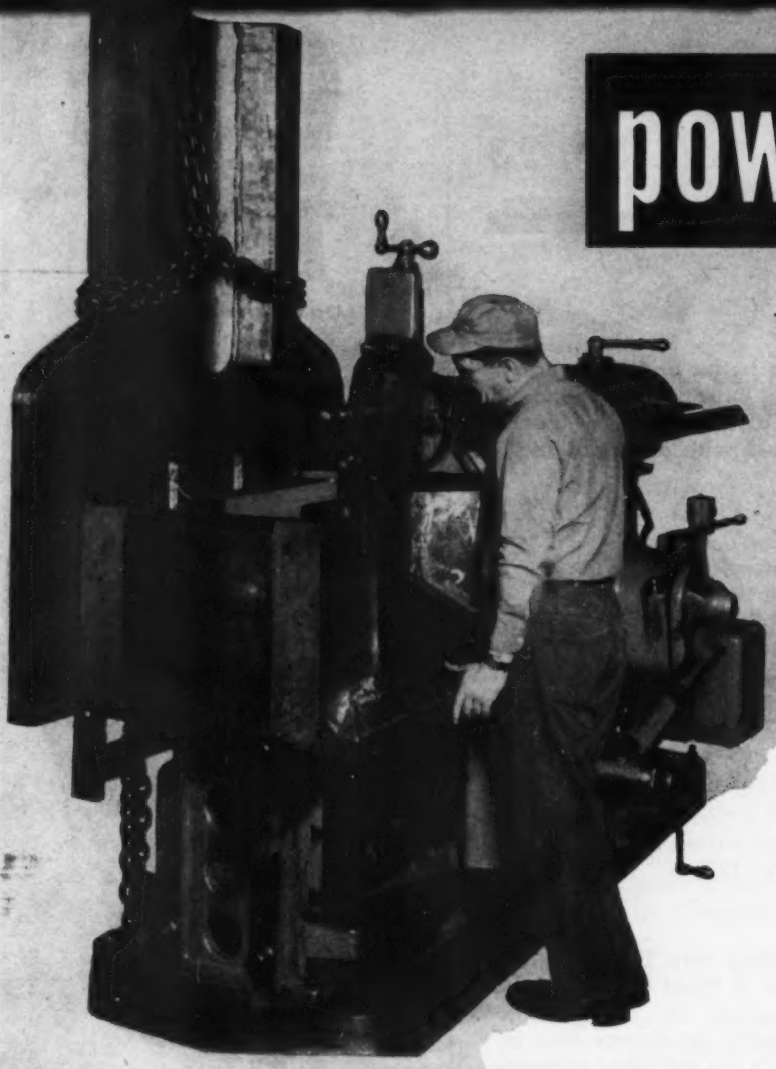
Freight car builders will not start producing cars at the rate of 10,000 per month until sometime in May. Problems the industry must face are enormous. Biggest is correlating steel deliveries and component parts.—p. 141.

Coming Next Week

The cost of pickling with phosphoric acid can be cut more than 60 pct by a new process which reclaims the acid for re-use. In many cases cost may be below cost of sulfuric acid pickling.

Indexed in the Industrial Arts Index and the Engineering Index. Published every Thursday by the *CHILTON CO. (INC.)*, Chestnut and 56th Sts., Philadelphia 39, Pa. Entered as second class matter Nov. 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries $15; other Foreign Countries $25 per year. Single Copies 35¢. Annual Review Number, $2.00.

powerful!



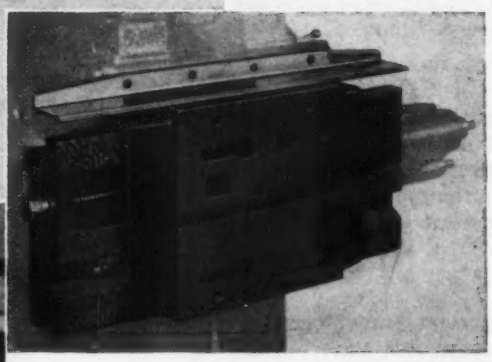
Jobs like this 5300# weldment are easy on a Cincinnati

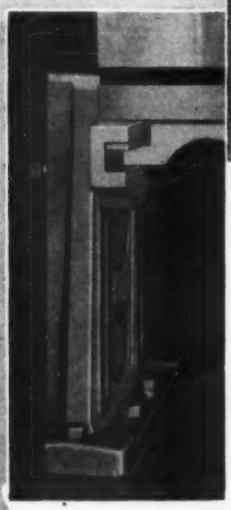
Cincinnati Shapers are powerful and dependable...

Cincinnati Shapers handle very heavy work—are powerful metal removers. They are dependable and trouble free on the most demanding jobs.

The extra long feed of the Cincinnati tool slide gives the needed range to shape the long blind hole of this large weldment. Dovetailed tool slide and accurately gibbed ram, with extended bearings, prevent chatter under these severe conditions. Table feed and power rapid traverse operate smoothly even with this 5300-lb. load.

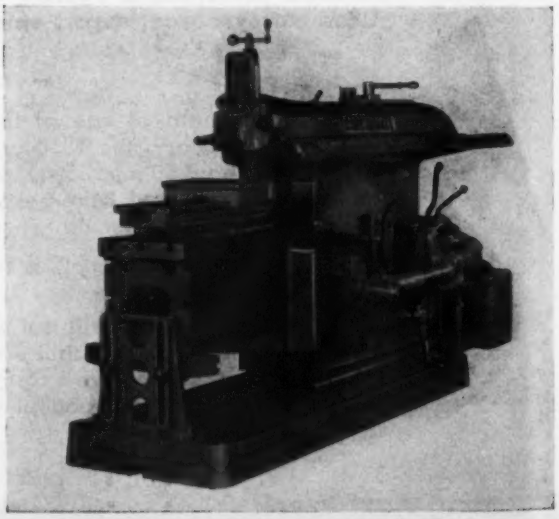
Cincinnati Shapers work to close limits and are profitable in both tool room and production departments.





This massive cross rail securely supports the apron on three automatically lubricated bearing surfaces. All controls are at the operator's position. The cross rail is square-locked to the column and automatically lubricated. Alignment is maintained by taper gibs.

This sturdy table support has the sliding action at the table and is gibbed to maintain alignment. Sliding surfaces are completely protected against dirt.



Write for Catalog N-5

THE CINCINNATI SHAPER CO.

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Editorial

INDUSTRY VIEWPOINTS

Words, Words, Words and More Words

THE man on the street has been talked down to, up to, around and in circles. He has been measured, surveyed, tested, cursed, praised and forgotten.

But this man—or girl on the street too—is so far ahead of the country's leaders that it isn't funny.

He has been told less by his government and has done more thinking for himself than anyone knows. Even so, he has had to get along with words and more words.

Our man knows that Russia is behind much of the world's troubles. He knows that the Administration missed the boat many times on international policy. He knows you can't appease a madman with measures that apply to normal, peace-loving people.

The government has opened up a little more recently. But Mr. Acheson did not say anything new last week. He did say that Russia is the aggressor. But it took "interpretation" of his talk to find this out. Even top officers in the military haven't said anything on or off the record that any high school kid hasn't figured out for himself—ask one?

They say the man on the street is not ready. That he doesn't know how bad things are. That's the biggest piece of baloney that has been sliced for some time.

The ones who don't know much about what gives are in places other than on the street or in the offices of industry.

Everyone in government tells the people vaguely what they must do, what they must sacrifice and what a jam we are in. But these officials have not yet found out what defense items are needed. They have not told business what they want nor will they even give a rough guess.

Congress professed to be shocked last week with the news from Korea. Anyone who could read or anyone who has had experience with a bully and a liar should have been prepared for Red Chinese intervention and UN reverses.

Let's not blame the people. Let's get those in charge of defense to make up their minds where they are going, when they are going and what they need to go there. Then let's have them tell in plain, simple, two-syllable words what they want the people to do. The people will deliver—they always have.

Tom C. Campbell

Editor

NEWSFRONT

NEWS, METHODS AND PRODUCT FORECAST

► One of the knottiest problems in aircraft turbine design is how much and what strategic metals to use. As the aircraft program mounts there will not be enough critical materials to make engines as efficient as unlimited use of strategic alloys would permit.

The alternative will probably be to make more engines of lower quality rather than fewer top efficiency engines. Which would mean shorter life per engine and more materials--including steel--to keep an equivalent number of planes in the air.

► Barium Steel is considering an expansion program that would tremendously increase steel capacity in the East.

► A major maker of tool steels and carbides is now field-testing two important new tool steels. Laboratory tests so far indicate one will be better than carbides for lamination dies, and the other shcuild outlast standard tool steels by as much as 400 pct for work on deep drawing steels.

► Development of new salvage techniques has been a major concern of the auto industry during the postwar era. One plant has recovered about 22 pct of the sheet clippings formerly disposed of as scrap. The company estimates it saves enough metal to make an extra car in every 50 produced.

► Rapid fire delivery of supplies from flying aircraft to ground units can now be done 12½ times faster than it was in World War II. An overhead monorail in the C-119 cargo plane is used to dump 5 tons of cargo into a 1500-ft area in 7 seconds.

► Four optical companies which have been testing the use of "continuous vision lenses" by industrial workers since 1948 are ready to launch a sales campaign based on their findings. Campaign will be aimed at metalworkers, shipping people, accountants and musicians. The triple vision lenses have been found most helpful to workers above 40 years who have difficulty focusing at different distances.

► Pig iron, which has been in fairly good supply until recently is tightening up with the expansion in steelmaking capacity. Two very big steel companies are now scouring the country for new supply sources. Most of these sources will be temporary--until steel companies bring in new or enlarged blast furnace facilities of their own.

► Suppliers to automobile companies are increasing their calls to the auto-makers for help on steel and other critical metals. There is nothing in sight to indicate any improvement in the situation.

► Taking a cue from automatic lifeboat signaling, a unit has been designed so that Air Force planes will automatically transmit distress signals on the flip of a switch. An automatic keyer will send out the signal until it is switched off or destroyed.

► The wage agreement between basic steel companies and the United Steelworkers of America with its average increase of 16¢ an hour eliminates the biggest barrier to wage and price controls by the Administration. Only remaining big labor factor which hasn't had a fifth round boost is the United Mine Workers. An all-time cost-of-living high is building more pressure for controls.

50 YEAR report to our customers -

FROM DATE OF INCORPORATION ON NOVEMBER 23, 1900 TO DECEMBER 31, 1949

THE COMPANY RECEIVED:			
From customers for products purchased by them		$5,122,702,261	
Dividends received, interest earned, and other income		76,068,236	
Total revenues		$5,198,770,497	
THE COMPANY PAID OUT OR PROVIDED:			
For raw materials, supplies, and services bought	$2,766,354,971		
Provision for depreciation (wear and tear or obsolescence) of plants, buildings, machinery and equipment and for depletion of coal, iron ore and limestone, etc., by mining operations	270,852,709		
Federal, State, local and miscellaneous taxes	267,462,953		
Interest and other costs on long-term debt (including dividends of $27,265,805 paid to preferred shareholders)	117,724,128		
Total costs		3,422,394,821	
Leaving for wages and salaries of employees, dividends to shareholders, and amount required to be retained by company for needs of the business		*$1,776,375,676	100.00%
***OUT OF WHICH THERE WAS PAID:**			
Employment costs (pay rolls, vacations, social security taxes, insurance and pensions paid to or for account of employees)		$1,474,693,687	83.02%
To common shareholders as dividends		125,126,950	7.04
Amount retained in the business for present and future needs and to assure steady work for employees		176,555,039	9.94
Total		$1,776,375,676	100.00%

Your patronage and the American system of free enterprise have helped make this company an important factor in the steel industry. Our future depends on keeping America free, so that any group of citizens may organize a business, at any time--with the expectation that it, too, may grow strong--provide jobs, supply needed products and achieve success in the next 50 years. In the preservation of the American way of life lies our future hope.

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON, ALLOY AND YOLOY STEELS

ELECTROLYTIC TIN PLATE - COKE TIN PLATE - WIRE - COLD FINISHED CARBON AND ALLOY BARS - PIPE AND TUBULAR PRODUCTS - CONDUIT - RODS - SHEETS - PLATES - BARS - RAILROAD TRACK SPIKES.

Mild Reaction to Steel Price Hike

Weighted Average Is $5.82 a Ton

NPA Revises Steel Priority Rules

The Iron Age SUMMARY

IRON AND STEEL INDUSTRY TRENDS

STEEL consumers are reacting mildly to last week's steel price increase. To most of them availability of steel is the primary consideration. Cost is of secondary importance.

Another reason for their mild reaction is that most of them had anticipated the price boost. When it finally came it was smaller than they had expected. Pre-settlement estimates of the increase had ranged from $6 to $10 a ton. The weighted average increase for the industry so far is actually only $5.82 per ton of finished steel. This figure will vary slightly among companies, but this is the average increase for the industry. The price increase covers only the cost of the wage settlement; most steel firms are absorbing increased materials costs which now average more than $4 a ton.

Boost of Only 0.291¢ Per Lb

The steel price increases boosted THE IRON AGE finished steel composite price from 3.837¢ per lb to 4.128¢ per lb, an increase of only 0.291¢ per lb. This finished steel composite price is based on weighted shipments of 10 major finished steel products.

Most other major steel producers have indicated that they will meet the new prices announced by U. S. Steel effective Dec. 1. They are also adopting the pattern-setting wage agreement which provided a wage boost averaging 16¢ an hr for steelworkers.

The settlement with the steelworkers' union, and the resultant steel price boost almost complete the fifth wage-price round. With latest cost-of-living figures at an all-time high, price-wage controls are much nearer this week. John L. Lewis is the only big voice in labor still to be heard in the fifth round. He is expected to move at top speed to get in under the control barrier.

The desperate plight of U. S. forces in Korea means that Congress will quickly agree to the President's request for $17.8 billion more for defense. The full impact of defense spending will come sooner and cut deeper into civilian goods than had been expected. A controlled materials plan by the end of May—if not sooner—now seems certain.

Revises Steel Priority Rules

As predicted, the National Production Authority has found it necessary to revise its rules on steel priorities. (DO ratings.) **Leadtime on** orders, which had been uniformly 45 days, now varies from 45 days to 120 days depending on the product. Also, some of the limits on DO orders which mills must accept have been raised. Significantly, limits on hot and cold-rolled sheets were raised from 5 pct to 10 pct. The higher limit will also prove inadequate within a few weeks.

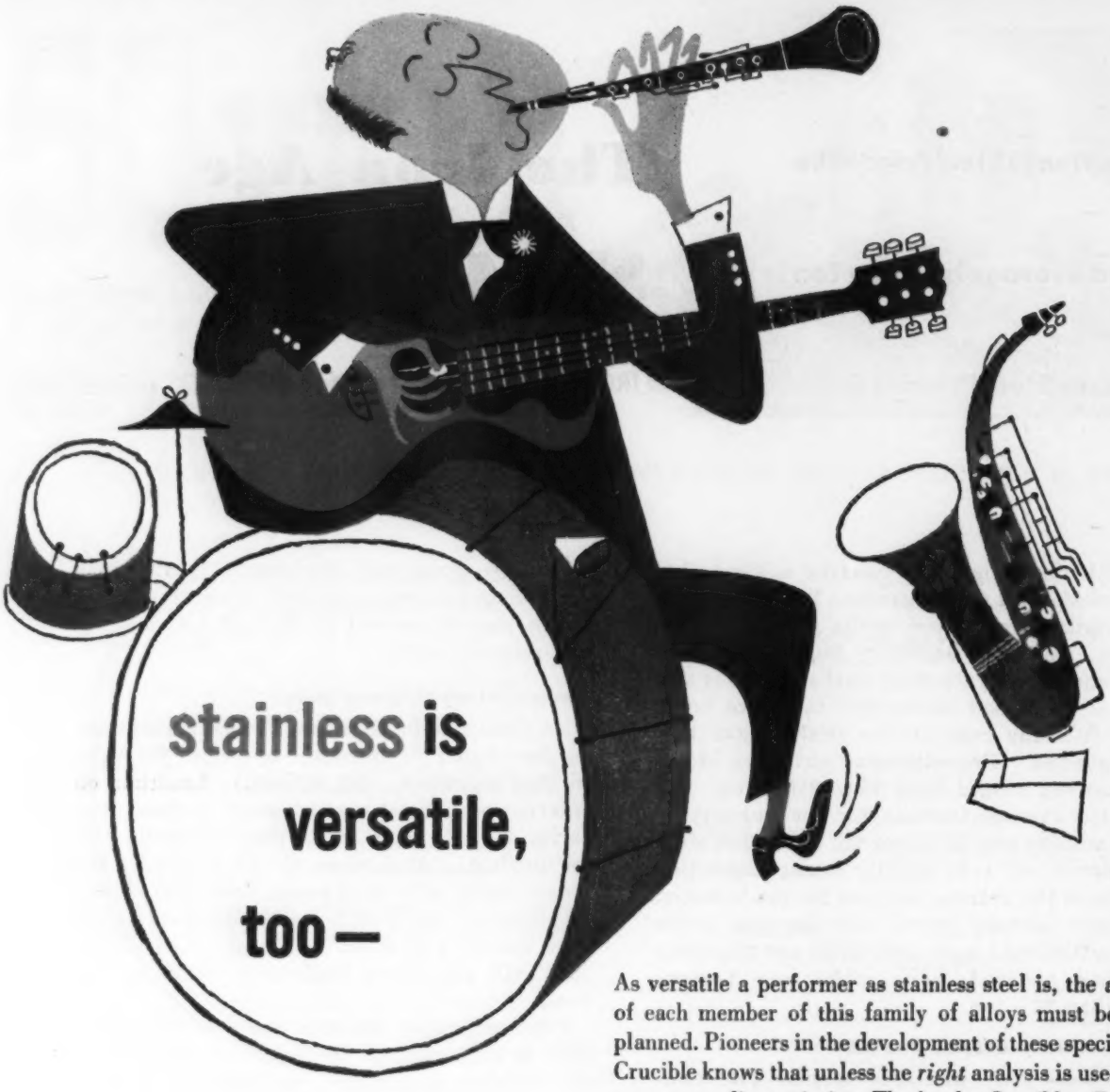
Consumers feel that the methods now being used to curb civilian consumption of materials are causing confusion and creating a wild scramble for materials that seems entirely unnecessary. Regardless of the reason, steel demand pushed to a new high this week. One very large consumer is extending its conversion through the first quarter of next year; this firm is paying $200 (about double regular mill price) a ton for a substantial amount of its steel.

Scramble for Freight Car Steel

Freight car builders are scrambling to place as many orders as they can under the allocations system which starts in January. Some have tried to place their total first quarter needs in January. Such practices as over-ordering will prevent a fair distribution of steel under the freight car program and prevent the industry from reaching a 10,000 car a month peak during March or April as would be expected.

Steelmaking operations for this week are scheduled at 100.5 pct of rated capacity. This is an increase of 18½ points from last week's revised rate of 82 pct caused by record snow in the Pittsburgh, Youngstown, Cleveland areas.

(Nonferrous summary, p. 188)



stainless is versatile, too—

As versatile a performer as stainless steel is, the application of each member of this family of alloys must be carefully planned. Pioneers in the development of these specialty steels, Crucible knows that unless the *right* analysis is used, stainless may prove disappointing. That's why Crucible offers you the services of an alert staff of metallurgists and engineers to help you apply stainless . . . properly. These engineers and metallurgists have all the wealth of experience that Crucible's half century of specialty steel leadership provides . . . take full advantage of it.

Whatever your stainless application may be, Crucible is prepared to help you. Whether the order is in pounds or tons, Crucible tackles every industry-posed problem with a keen devotion to detail. If you're thinking of stainless . . . call in Crucible. CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

CRUCIBLE first name in special purpose steels

STAINLESS STEELS

fifty years of Fine *steelmaking*

STAINLESS • HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

We don't Sell Your Customers

One of our prospects (prior to becoming a customer) asked us whether we would sell tubing to him and also accept orders for tubing from *his* customers.

We shouted an emphatic "No!"

That question is often asked by those who select concerns to supply material as components of their finished products or for sale over their counters.

Over many years we have maintained a definite policy of *not* competing with our customers. We try to protect their interests for we sincerely appreciate the relationship we have with them.

As a customer, you can feel free to come to us for any help you need, knowing that your problems can be discussed with us in strict confidence.

If you're our customer, we like that. And we're not your competitor, so *you* like that.

Let us be of help to you.

WOLVERINE TUBE DIVISION
Calumet & Hecla Consolidated Copper Company
INCORPORATED
MANUFACTURERS OF SEAMLESS, NON-FERROUS TUBING
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Sales Offices in Principal Cities

Dear Editor

Letters from Readers

Identity Unknown

Sir:

We are unable to identify a bar of tool steel which we have had in our plant for some years, and believe you may be able to help us. The bar is marked with the letters U-C-E-M-A-C. This was furnished to us by a New York distributor, The Vulcan Steel Corp., who have since discontinued business. We should like to know the analysis, if possible, in order that we may be able to heat treat the material properly.

J. B. KENT
Hackensack Specialty Mfg. Co.
Hackensack, N. J.

After a number of inquiries, we are still unable to identify the tool steel carrying the letters U-C-E-M-A-C, or find any trace of a New York firm known as the Vulcan Steel Corp. There is a long-established tool steel producer known as the Vulcan Crucible Steel Corp. of Aliquippa, Pa. However, their New York distributor doesn't recognize the designation. Perhaps one of our readers can turn up the answer.—Ed.

Handy Reference

Sir:

May I ask you to let me have a cut with the article by W. F. Brown, Jr., and M. H. Jones on the use of photogridding for strain analysis (THE IRON AGE, Sept. 12, 1946, p. 50). Such information is required to include in an article I have to prepare for the Swiss technical press on the subject. I may add that all information received would be published with due acknowledgement.

N. G. NEUWEILER
Consulting Engineer
Geneva, Switzerland

We are sorry to say that cuts for this article are no longer in our files. For brief additional information on this subject, refer to our Oct. 27, 1949, issue. More details might be obtained from National Advisory Committee for Aeronautics, Washington 25, D. C.; ask for NACA Technical notes No. 1010, 1385, 1512, 1513.—Ed.

Why Not Magnesium?

Sir:

Your "Newsfront" of Nov. 23 mentions a titanium base plate for mortars. Undoubtedly a Russian move to tie up our titanium production.

What is wrong with magnesium? A tenth of the cost and 4/10 of the weight of titanium, less critical for an expendable part, easier to form and no temperature problem. I think someone slipped a cog; perhaps you or your readers can think of an advantage for titanium.

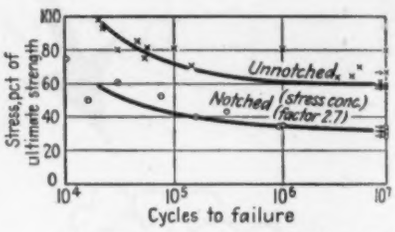
My colleagues say, what about notch sensitivity? This is primarily a function of ductility and allowable stress. A comparison of aluminum, magnesium and titanium follows:

	Al, 51S-T6	Dow Metal, O-1	Ti Bar, Hot-Forged
Tensile, psi ..	48,000	46,000	90,000
Yield, psi ...	43,000	31,000	75,000
Ductility, Pct Elong..	17	8	18

On this basis, aluminum of slightly greater thickness (to reduce stress) would be the best bet, but magnesium is not impractical with a large thickness.

L D. BARRETT
Engineering Dept.
Westinghouse Electric Corp.
Philadelphia

We don't know why Ordnance has become so enthusiastic about titanium for base plates, other than the fact that pressure is on for lighter weapons to give more firepower per man in the field. The latest report indicates that Ordnance is making comparative tests on all 3 materials. The impact properties of the 3 metals may be important. Charpy properties of aluminum and magnesium are quite low, while commercially pure titanium shows at least 17 ft-lb at room temperature. Notch sensitivity data are shown in the accompanying curves, prepared from rotating beam tests on annealed RT-70 titanium.—Ed.



Courtesy of Rem-Cru Titanium, Inc.

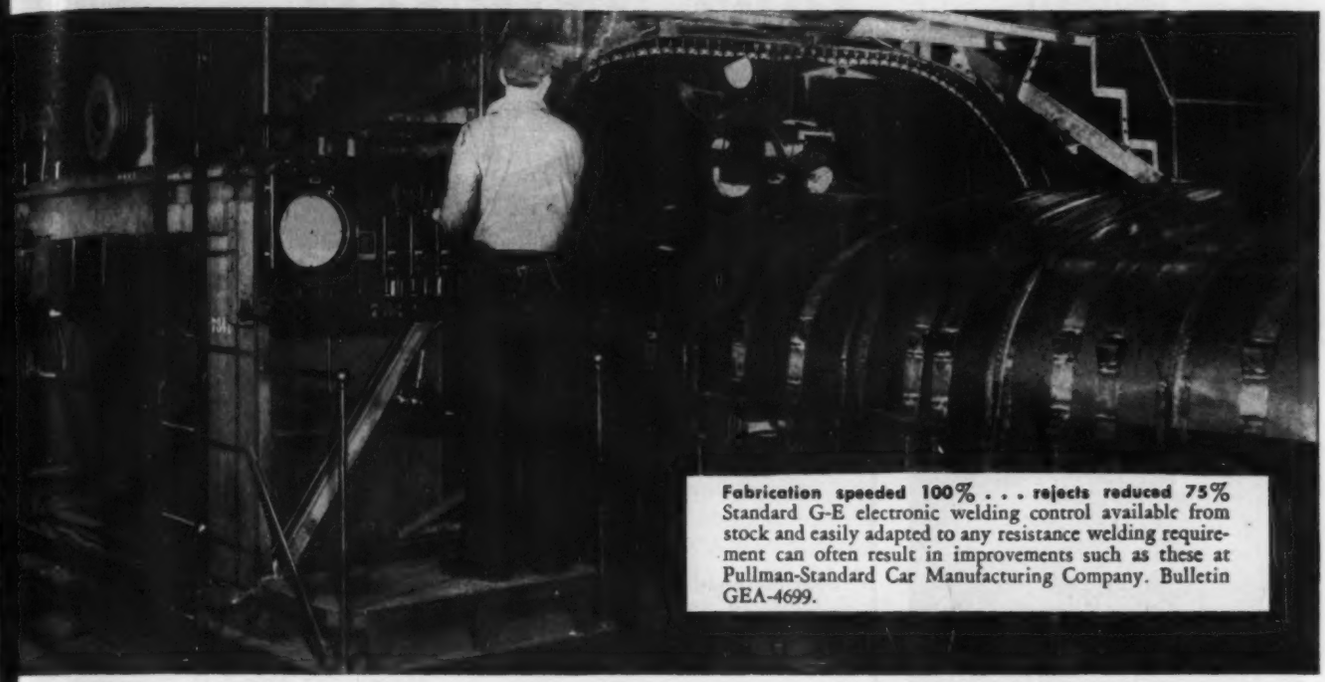
Right Up Our Alley

Sir:

In your Nov. 2 issue on p. 107 you had an article regarding titanium standards and extras for titanium. We are very much interested in obtaining further information regarding the manufacturing use of this metal and thus we had written the Titanium Metals Corp. in Dunkirk, N. Y., which we understood manufactured the wire items, in which we were interested. Our letter was returned by the post office, as the firm and address were unknown in Dunkirk. We shall deeply appreciate your advising us of their mailing address so we may write them directly.

J. V. E. ZINK
Sales Manager
Southern Screw Co.
Statesville, N. C.

Titanium Metals Corp. of America is located at 60 E. 42nd St., New York 17, N. Y.—Ed.



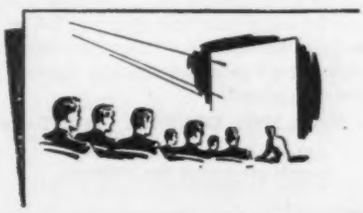
Fabrication speeded 100% . . . rejects reduced 75% Standard G-E electronic welding control available from stock and easily adapted to any resistance welding requirement can often result in improvements such as these at Pullman-Standard Car Manufacturing Company. Bulletin GEA-4699.

4 more companies improve production

WITH G-E ELECTRONIC RESISTANCE WELDING CONTROLS

Weld faster, cleaner, and with less kva demand. Weld new alloys. There are G-E electronic controls to help *you* improve production, improve *your* product, reduce costs just as they have done in the cases described here. Take advantage of the newest improvements and developments in G-E control—the wide experience of our welding control specialists. Together with your welding machine manufacturer, they'll help you solve production problems. Write your nearest G-E office today for more information. *General Electric Company, Apparatus Department, Schenectady, New York.*

REMEMBER . . . GOOD resistance welding depends on GOOD electronic control. When you buy insist on G.E. . . . longest in the business with the most complete line of resistance welding controls. For quick and easy training of operators ask your welder manufacturer, power supplier, or the nearest G-E office for a FREE showing of the sound, all-color movie, "This is Resistance Welding," a General Electric More Power to America film.



You can put your confidence in—

GENERAL ELECTRIC

645-53

Fatigue Cracks

By CHARLES T. POST

Beat the Food Bill

You've probably noticed that George Elwers, the brains department bachelor, is the man who keeps us posted on the outside world. The other day George came rushing back from a visit to Republic Aircraft, out at Farmingdale, L. I., where he'd been to investigate a new gaging system.

The big news at Republic, George admitted confidentially, was not so much the gaging system but what he'd had at the plant cafeteria for lunch. Lobster Newburg, no less. For 75¢ a throw. The menu also had five kinds of meat, no beans or spaghetti, at comparable prices. And a choice of potatoes fixed three different ways. Shrimp, oyster, or clam cocktail to start out with, if you wanted it. In all the plants he's visited—and that's a lot—he says he's never seen anything like it. And the girl at the counter told him that was a typical day's menu.

Now it seems Republic is having a devil of a time hiring engineers. The employment ads don't draw much response. Our idea is that if Republic would lay off talking about salaries, insurance, benefits, and that sort of thing, and merely print the day's menu, they wouldn't have any trouble hiring any engineer they wanted. We might even give up publishing.

Aptronyms

Pending nominations for the aptronym honor roll include these:

Miss Luella Proffitt and William H. Cash, who got married in St. Louis last week, according to an item submitted by Austin Phelps of the U. S. Engineers.

Prof. Elzada U. Clover, associate curator of the University of Michigan Botanical Gardens.

F. L. Lock of Yale & Towne, Inc. —a Yale lock, of course.

Our old friend Marie P. Fish, of the Narragansett Marine Laboratory, who hove over the horizon again by giving a technical paper at the Acoustical Society of America, on "Fish Noises in the Narragansett Bay Area." D. C. Pugh of South Charleston, W. Va., made the nomination.

And last but not least, Mrs. Robert W. Parent of Seattle, who gave birth to a son. C. C. Finn points out that here's a gal who became a Parent the exact day she was married, with no censure implied.

History Repeats

According to a suggested newspaper filler supplied by U. S. Steel, "Egyptian ladies in 900 B. C. carried vanity cases made of iron, almost a precious metal in those days." *Almost a precious metal! In those days!*

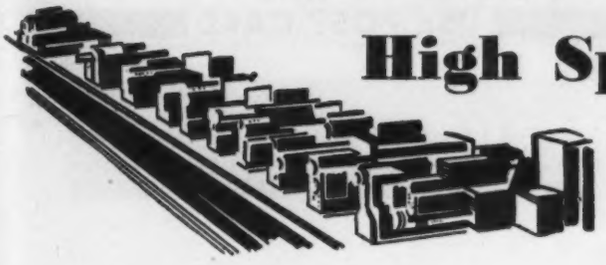
Puzzlers

Charles E. Norton, Benjamin L. Obear and C. I. Gardner have us out of the hole on that oil drum problem (Nov. 23), we think. They figured out the answers of 29.19 and 29.2 gal, respectively, using something called "Mark's formula for the volume of any ungula of a right circular cylinder." A. L. Graburn, Jr., says 6776.8 cu in. would be about right. That's 29.3 gal. Ungula? You'll have to look it up for yourself. R. W. Huff, Republic Steel, put the Nov. 9 tire dealer problem up to his son, a high school junior, and the boy came up with the right answer.

Nothing to report yet on last week's problem of drilling the cube.

For a breather, try this one from E. M. Hoover, but watch out: An egg speculator invests half his funds in eggs at 50¢ a dozen and the other half of his funds in eggs at 60¢ a dozen. He later resells the eggs, half of them at 50¢ a dozen and the other half at 60¢ a dozen. Does he break even? If not, what is his profit or loss per dozen?

MACHINE TOOL High Spots



Sales Inquiries and Production

By W. A. LLOYD

Priorities Wanted—Faced with new and seemingly insuperable demands, a worried machine tool industry needed a pair of priorities to put it on a wartime footing this week, probably the only basis on which present commitments can be kept.

First need is a blanket rating for materials, as machines are starting to pile up on assembly floors for lack of certain materials or components.

Distribution Control — Second, the industry needs a priority system similar to the World War II Order E-1-B, controlling distribution of machine tools.

The blizzard of business in the past 90 days has practically snowed the industry under, and new facets of the domestic and foreign defense programs are developing daily.

Delivery Pressure On—In wake of the steel price increase, machine tool companies have felt greater pressure for delivery by customers who not only need the machines, but fear additional price increases. Reports of fringe price increases by some machine tool companies have added to this pressure.

Foreign Placements — Foreign programs, particularly in Britain, France, Norway and Sweden are developing rapidly and placements are being made. ECA has ordered the Norwegians to place their business before Dec. 31, 1950, for delivery not later than June 30, 1951. Companies are not generally able to consider this business for delivery at date stipulated, and ECA is working on covering priorities.

Domestic Programs — Domestic armament programs are coming through, some piecemeal, others in their entirety. Placements for guns and guided missiles are being made, and tank and aircraft engine programs are being placed.

As a result, some machine tools that haven't been in demand for 5 years are being ordered in quantity, and one sales manager reported having 40 such machines on order.

Orders Large—In addition to this feverish activity, many companies are ordering machine tools they need with or without a defense program, giving industry its biggest backlog of all time.

Same Old Cry—A monotonous song and dance of early World War II days was revived this week in Washington when Munitions Board experts were quoted as saying the nation's expanded defense program is being delayed by a serious bottleneck in machine tools that probably won't be ended for a year and a half.

According to Munitions Board estimates, the industry in a real emergency should deliver 200,000 machine tools a year. Before Korea, these deliveries were at the rate of 45,000 a year and by the end of the calendar year, the rate will have been boosted to "only 75,000."

"Even by the end of 1951, we'll be turning out only 125,000 machine tools a year."

MB Stockpiles 98,000—The Munitions Board, charged with stockpiling machine tools, has only 98,000 items in storage. It should have 250,000. Spokesmen say they've never had enough money to build up the stockpile. The board isn't in the market at present, since all machine tools being produced are needed for the defense effort.

"If war came tomorrow, the shortage would be terrific," one board spokesman is quoted as saying. "If it holds off for 2 years, we'll have enough time."

Eighteen Months Late—Activation of tentative production schedules 18 months ago, when the machine tool industry was at low ebb, would have gone far to prevent the present shortage. It would also have enabled the industry to keep its men, and maintain material quotas at a flexible level.

Base Exemption—In Washington, George S. Eaton, executive secretary, National Tool & Die Mfrs. Assn., recommended 15 pct of gross sales as a base exemption for small manufacturers under an excess profits tax, in a statement to the House Ways and Means Committee at the hearing on the proposed excess profits tax.

"In a cyclical and erratic industry such as ours, any shop making less than 15 pct before taxes, on gross sales, in normal years can hardly expect to stay in business, to say nothing of expanding," Mr. Eaton stated.

Mid-Year Upswing—"After generally poor business in 1949 and 1950, orders for special tooling took a definite upswing last March and showed a strong improvement in shipments in June," he said.

"There is good reason to believe that this improvement would have continued throughout 1950 if there had been no Korean War."

FREE — USE POST CARD

PUBLICATIONS

New publications that describe money saving equipment and services are available free and without obligation. Copies can be obtained by filling in the attached card and mailing it.

New Thickness Gage

The x-ray thickness gage, designed to provide a non-contact method of measuring cold-rolled steel strip thicknesses from 0.0050 to 0.1196 in. as it passes through cold mill operations—at the high speeds of the rolling mill, or at the speeds of the slower processing lines—is described in a new 8-p. booklet. The booklet presents the basic theory of the gage, block-diagramming its electrical circuits to explain its operation. The operator's control, the gaging unit, and the indicator unit are fully described. Complete electrical and mechanical specifications also are given. *Westinghouse Electric Corp.*

For free copy insert No. 1 on postcard.

Iron Deoxidizer

Benefits from deoxidation with Electro-Carb briquets that result in top quality iron castings are covered in a new 4-p. bulletin. The folder tells how this selected grade of metallurgically reactive silicon carbide is used in all types of gray and malleable iron; typical cupola charges are listed to demonstrate how the material may be easily incorporated in the mixture. A new series of resin bonded abrasive-combination grinding wheels for iron, made by the same company, are also described. *Electro Refractories & Alloys Corp.*

For free copy insert No. 2 on postcard.

Anti-Corrosion Coating

Highlights of Zincilate, the anti-corrosion coating in which the zinc itself is protected from atmospheric oxidation, are presented in a new 8-p. booklet. Long service life and high resistance to corrosion and abrasion are among the features discussed in the bulletin. The two basic formulations available are described, and one section deals with methods of applying the coating. *Industrial Metal Protectives, Inc.*

For free copy insert No. 3 on postcard.

Decal Nameplate Manual

Hundreds of problem-solving uses of decals on glass, metal, wood, china, plastic, rubber and leather, on curved, flat or flexible surfaces, are shown in a new 20-p. booklet. *Meyercord Co.*

For free copy insert No. 4 on postcard.

Precision Grinder Folder

Tool and die makers in particular and also production shops will be interested in a new folder on the Micro Grinder. This new grinder for wet or dry grinding is illustrated in standard set up for both applications. It is also illustrated as set up for grinding punches, dies, gauges, special shapes, sizes and extra large parts. Construction details are explained and illustrated, and full specifications are included in the folder, along with information on some of the most commonly used accessories. *Sanford Mfg. Co.*

For free copy insert No. 5 on postcard.

Liquefies Helium

The Collins Cryostat, a self-contained low temperature refrigerator which can liquefy helium and maintain any temperature down to —270°C without auxiliary refrigerants, is described in a new 6-p. folder. General features and operation of the equipment are explained and the heart of the unit, a 99-pct efficient heat exchanger in conjunction with two expansion engines and final free expansion, is described in detail. *Arthur D. Little, Inc.*

For free copy insert No. 6 on postcard.

Metal Cleaning

An illustrated folder entitled "Metso 66 For Metal Cleaning" describes properties of the granular detergent for chemically cleaning metals of grease, oil, buffing or polishing compounds prior to plating or finishing. A chart shows directions, including concentrations and temperatures for soaker-tank cleaning, electro cleaning prior to plating steel, copper, nickel, chromium, brass, die-castings, and cleaning steel prior to enameling. *Philadelphia Quartz Co.*

For free copy insert No. 7 on postcard.

Close Tolerance Tubing

Text material in a new 8-p. folder entitled "Compression-Formed Tubing" describes the process, tolerances, surface finish, decarburization, mechanical properties, types, shapes and sizes. The folder gives profilometer readings and shows how the compression-forming process increases mechanical properties of steel. Photos show how dies compress tubing over a mandrel, and typical close-tolerance parts that

Turn to Page 174

SERVING and SAVING

ALL INDUSTRY

Like hundreds of other manufacturers, you, too, can save money if American Welding makes your rings, bands and welded products.

Included in the thousands of products we supply to other manufacturers are parts for jet engines and airplane motors, refrigerators, generators, electric motors, road building equipment, and material handling equipment, to mention just a few.

We believe we can save money for you. Designers, engineers, and metallurgists are ready to work with you and for you. All types of resistance and fusion welding equipment for working with ferrous and non-ferrous metals and alloys are available, as well as heat-treating and machining facilities.

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NEW PRODUCTION IDEAS

Continued

zone being controlled. Remote transmission allows supervisory monitoring of multi-unit, single zone control. The instrument is calibrated to ± 1 pct accuracy *Minneapolis - Honeywell Regulator Co.*

For more data insert No. 25 on postcard, p. 35.

Hob Sharpening Checker

Measures errors in hobs or formed cutters due to face sharpening.

This precision instrument inspects radialism, flute-to-flute spacing, total spacing, face offset and accuracy of straight flutes with the axis of hobs and cutters. It can also be used for checking runout of faces and OD of hobs and OD runout of the hob or cutter

itself. The checker is designed to utilize the standard index plates of the Barber-Colman No. 10-12 hob sharpening machine. Checking is done by means of an indicator mounted on a surface plate. Extra heavy construction provides rigidity for checking large hobs and cutters and maximum resistance to vibration, shock and wear. *Barber-Colman Co.*

For more data insert No. 26 on postcard, p. 35.

Second Operation Lathe

Spindle speeds of 1020 and 2010 rpm; height of centers 3 15/16 in.

The second operation bench lathe is equipped with lever operated collet attachment, tailstock and compound slide on which the front and rear toolholders are adjustable for height. Angular adjustments up to 22° left and 33° right can be set on the front tool slide. Adjustable dead stops are provided for both compound slide and tailstock. The drive from the 2 speed motor to the main spindle is by a flat belt with an adjustable jockey pulley for tensioning. The lathe is

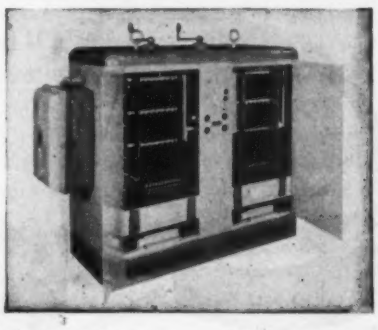
equipped with a ¾ hp motor and switch gear for 220 v, 3 phase, 60 cycles ac supply. *DCMT Sales Corp.*

For more data insert No. 27 on postcard, p. 35.

Dual Welders

Each dual unit offers two welding circuits in one common enclosure.

The circuits of new dual 300/600 and 400/800 amp selenium rectifier dc welders may be used independently, or in parallel to provide a single circuit of twice the capacity. Parallel operation is obtained by means of a bridle placed across the secondary output terminals. A clutch-and-sprocket and chain arrangement provides independent or unit operation of the current con-



trol handles on each individual welder. A primary contactor facilitates use of these machines on automatic and stud welding applications. *Westinghouse Electric Corp.*

For more data insert No. 28 on postcard, p. 35.

Dry Chemical Fire Engine

Smothering action of pressurized discharge said to be sensational.

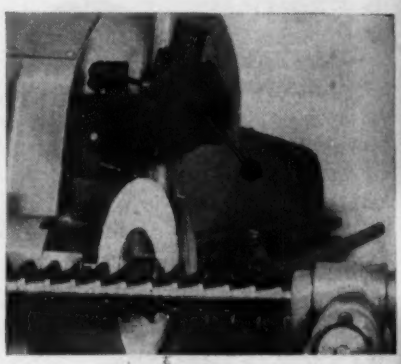
A new giant, wheeled portable fire extinguisher is power packed with 350 lb of fire extinguishing dry chemical compound, discharged at a maintained operating pressure of 200 psi by 2000 psi of dry nitrogen. Blistering hot flammable liquid and electrical industrial type fires of considerable proportions are reportedly quickly extinguished by its blanketing cloud, which also has an effect of cooling and insulating the operator from the heat. The engine carries the inspection and approval label of Underwriters, Factory Mutual Laboratories, with B and C classification. *American-LaFrance-Foamite Corp.*

For more data insert No. 29 on postcard, p. 35.

Wheel Dressers

Produce fine finish on radius and sides of broach grinding wheels.

A Dymon-ize grinding wheel dressing attachment, designed for use on broach sharpeners, consists of an adjustable mechanism that can be used to produce a fine finish



on both the radius and sides of a broach grinding wheel. The finer wheel finish has been found to increase surface smoothness on broaches and on the machined surfaces produced by those broaches. Smoother chip flow in curling up in the chip space is said to be a characteristic of broaches sharpened or re-sharpened with Dymonized wheels. Any radius ranging up to 5/16 in. can be readily dressed by a single adjustment. The unit has two control handles, one for dressing radii, one for dressing the side of the wheel tangent to the radius. *Colonial Broach Co.*

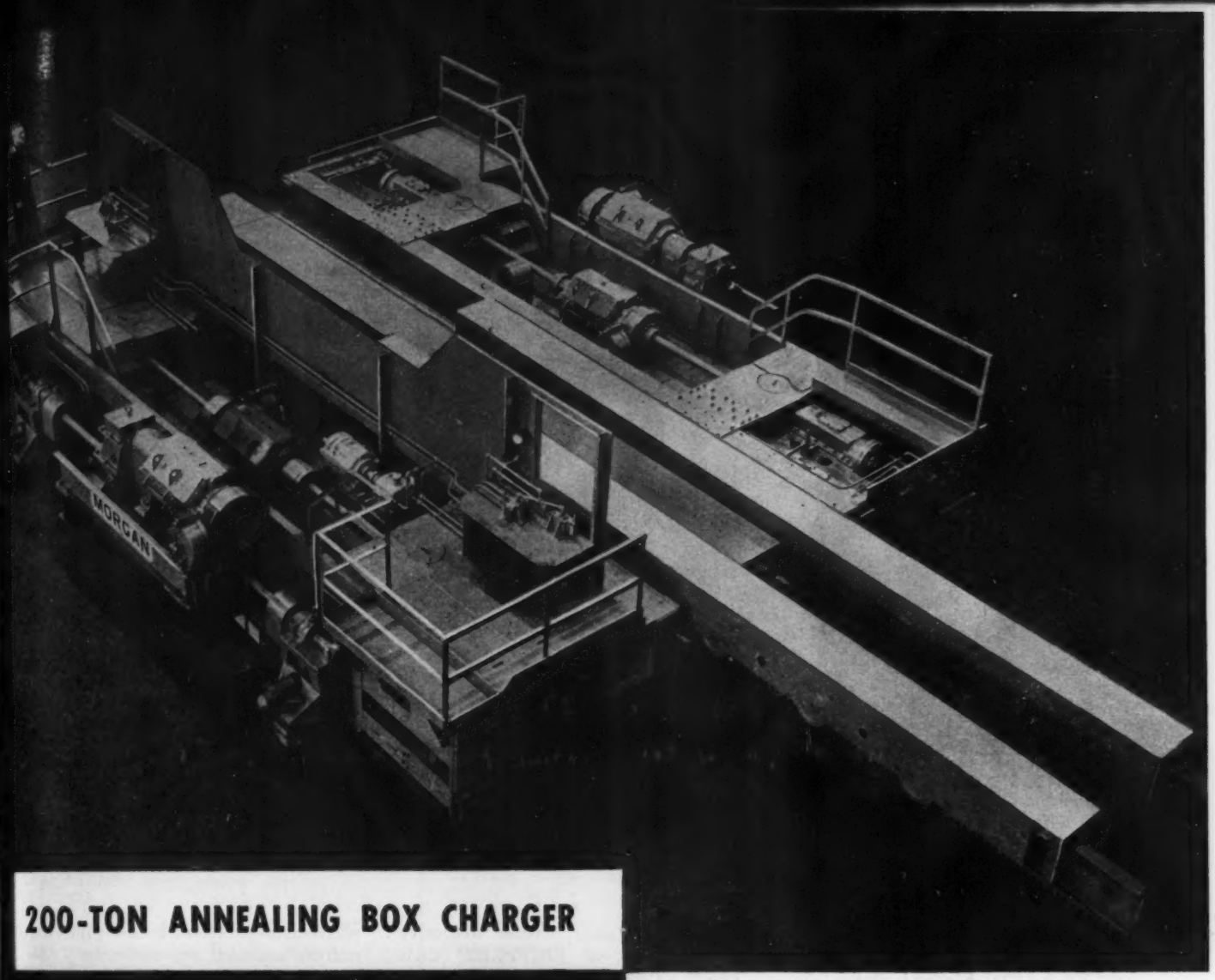
For more data insert No. 30 on postcard, p. 35.

Tilting Rack Trailer

Features hydraulic tilting rack for conveying oiled steel sheets.

A 15-ton capacity tractor-drawn trailer has two removable hydrauli-

Turn to Page 178



200-TON ANNEALING BOX CHARGER

BUILT BY MORGAN Engineering

Illustrated is a Morgan 200-Ton, 5-motor, 19′-3½″ Span Annealing Box Charger. It consists of a traveling bridge upon which are mounted two rack driven charging trucks operating in unison for raising the annealing boxes and moving them into or out of the furnace or onto the cooling beds. The charging trucks are operated by two motors through four worm units with provision for operating either of the two motors alone.

THE MORGAN ENGINEERING CO.

ALLIANCE, OHIO PITTSBURGH—1420 OLIVER BUILDING

DESIGNERS • MANUFACTURERS • CONTRACTORS • BLOOMING MILLS • PLATE MILLS • STRUCTURAL MILLS • ELECTRIC TRAVELING CRANES • CHARGING MACHINES • INGOT STRIPPING MACHINES • SOAKING PIT CRANES • ELECTRIC WELDED FABRICATION • LADLE CRANES • STEAM HAMMERS • STEAM HYDRAULIC FORGING PRESSES • SPECIAL MACHINERY FOR STEEL MILLS

Iron Age *Introduces*

LEON P. O'CONNOR, elected vice-president of Thompson-Starrett Co., Inc., New York.

A. C. DAUGHERTY, appointed manager of market research for Rockwell Mfg. Co., Pittsburgh.

CLIFFORD V. COONS, elected a director of Rheem Mfg. Co., New York.

Edward P. Geary, appointed executive vice-president of ATLAS STEELS LTD., Welland, Ont.

Frederick J. Willard, appointed vice-president-sales, and **F. Leroy Sherman,** vice-president-foreign operations of PHILCO INTERNATIONAL CORP., Philadelphia. **Radcliffe L. Romeyn,** formerly vice-president-sales, is now vice-president and executive assistant to the president.

Herbert L. Ross, formerly manager of manufacturing, meter and instrument divisions, GENERAL ELECTRIC CO., named manager of River Works, Lynn, Mass.

Oscar D. Wyatt, named sales representative for the western part of Los Angeles by ZIEGLER STEEL SERVICE CO., Los Angeles. He was with Columbia Steel Co. for 26 years and for the past 2 years with Rawlins Bros., Inc.

Thomas C. Gray, named director of engineering for PULLMAN-STANDARD CAR MFG. CO., Chicago. **Mr. Gray** joined the company in 1949 as manager of engineering production.

Harry J. Leddy, elected executive vice-president of SHIPPERS' CAR LINE CORP., New York. **John B. Davenport** appointed vice-president in charge of sales.

Thomas Pierrepont Hazard, elected a director, and **Forbes Silsby,** a vice-president of ALLIED CHEMICAL & DYE CORP., New York.

George J. Henrich, made vice-president in charge of purchasing, **George M. Streicher,** vice-president in charge of manufacturing, and **C. J. Smith,** vice-president in charge of engineering for MONROE AUTO EQUIPMENT CO., Monroe, Mich.

George C. Peters, formerly assistant superintendent, safety and welfare, Aliquippa, Pa., Works of JONES & LAUGHLIN STEEL CORP., Pittsburgh, appointed to the newly created position of safety engineer in the office of the supervisor of safety and welfare.

Henry N. Schumacher, named superintendent, cold strip mill and **William J. Walsh** superintendent, tinplate dept. for INLAND STEEL CO., Indiana Harbor Works, Ind. **John A. Keckich** transferred from the labor relations department to the cold strip mill as assistant superintendent. **Alfred J. Castle,** superintendent of the cold strip and tin mill departments, transferred to inactive status. **Harry C. Barnes,** superintendent of the cold strip mill, and **Stuart A. Koegle,** superintendent of the tin mill, also transferred to inactive status.

William E. Ruder, named manager and **Dr. John Herbert Holloman,** assistant manager of the Metallurgy & Ceramics Divs., Research Laboratory of the GENERAL ELECTRIC CO., Schenectady.

Elmer Gammeter, appointed director of laboratories for GLOBE STEEL TUBES CO., Milwaukee, succeeding Dr. H. K. Ihrig, who recently resigned. Mr. Gammeter has been chief metallurgist at the company since 1943.

H. W. Vogenberger, Jr., elected assistant general superintendent of the LAKE TERMINAL RAILROAD CO., Lorain, Ohio.

Arthur E. Raabe, appointed general manager, Eclipse-Pioneer Div of BENDIX AVIATION CORP., Teterboro, N. J.

C. Spence Purnell, formerly eastern district supervisor, general industry section, industrial division of WESTINGHOUSE ELECTRIC CORP., Pittsburgh, named eastern district manager of its new agency and construction division. **Dr. Daniel Alpert** appointed manager, Physics Dept., Westinghouse Research Laboratories, succeeding the late Dr. R. C. Mason.

J. K. Adams, appointed manager, Land and Lease Dept. of TEXAS EASTERN PRODUCTION CORP., Shreveport, La.

Bernard Stapp has joined CHICAGO-LATROBE, Chicago, as a district manager, covering the south central territory. Mr. Stapp succeeds **Victor E. Griffin,** who has been transferred to the Michigan industrial territory.

Frank P. Downey, made director of sales, AMF Pinspotters Div. of AMERICAN MACHINE & FOUNDRY CO., New York, and AMF Pinspotters, Inc., a subsidiary.

Walter S. Sheldon, named advertising manager of CORY CORP., Chicago, replacing R. Nicholas Hoye.

W. W. Black, appointed chief engineer, field engineering section, government products group of INTERNATIONAL HARVESTER CO., Chicago. During Mr. Black's absence, **F. J. Schreck** will be general supervisor of service, industrial.

Fred Dittman, appointed general manager, New York office of the BAY STATE SMELTING CO., and BRASS MILL MATERIALS CORP., Somerville, Mass.

LAWRENCE M. RICH, appointed vice-president and general sales manager of Plomb Tool Co., Los Angeles.

Iron Age Salutes

MORRIS E. LEEDS

MORRIS EVANS LEEDS went to Germany, birthplace of the science of instruments, to get his knowledge from the source. He adopted their thunder and made it louder in the United States as founder and now chairman of the board of Leeds & Northrup Co., Philadelphia.

Steelmaking might still be a hit-or-miss process were it not for instruments — and instruments would not be on their high scientific pedestal were it not for Mr. Leeds.

Clever is too shallow a word to describe Mr. Leeds. He is wise. His genuine modesty and gentility that stems from his Quaker upbringing in Philadelphia add instead of detracting from an initiative in industry that has ground no one underfoot and helped many up. He is the rare man about whom both his associates in industry and his employees speak sweetly.

Morris Leeds took his shiny new BS degree from Haverford College in 1888 and taught for 2 years. He has the wisdom and understanding to be a teacher, a fine one, but he had the restlessness to accomplish big things that sent him to Queen & Co., makers and importers of scientific instruments. Right then a career was born.

He soon saw that instrument makers in the U. S. were still toddling and had little to offer in the way of learning. Enrollment in the University of Berlin was followed by study and seeing. Mr. Leeds toured European plants soaking up the lore of instrumentation. At the Carl Zeiss works he saw quality production at its peak and industrial democracy at work. Both ideas fitted into his philosophy.

In 1899 Mr. Leeds left Queen & Co., now defunct, and started the business that was to become Leeds & Northrup. First the fledgling firm made instruments for laboratory use. Then came the turning point—the Leeds Mechanism Recorder—and Mr. Leeds' industrial path suddenly had many avenues. The very first Leeds recorder went to the steel industry and other instruments, controls, pyrometers, followed. Steel accepted them willingly to make a better, more uniform, and cheaper product.

When L & N employees and families were celebrating the firm's 50th birthday party last year, the festivities were interrupted by the presidents of the employee's Cooperative Assn. and the union. They presented to Mr. Leeds a resolution "on behalf of all" L & N people praising him for high ideals, achievement, and human relations in industry. A eulogy followed. There wasn't an exaggeration in it.

ROY J. DUSSEAU, named district manager, Dayton office, of E. W. Bliss Co., Canton, Ohio.

JOSEPH F. ECKEL, named manager, Large Motor & Generator Divs. of General Electric Co., Schenectady.

ELMER J. CARMODY, appointed manager of Engineering Foundry, Inc., Cedar Springs, Mich.

Paul Hickman, made manager, Industrial Tool Div. of REMINGTON ARMS CO., Bridgeport, Conn. **William J. Dougherty,** appointed manager of the trade analysis section; and C. **Gerard Peterson,** manager of trap and skeet promotion. **George C. Lambert** has retired as manager of ammunition sales and will be succeeded by **John H. Otterson. Harold W. Engstrand** will succeed Mr. Otterson as assistant on ammunition sales.

W. P. Hartman, named assistant general manager, Mechanical Dept., for the SANTA FE RAILWAY SYSTEM, Chicago. **Thomas T. Blickle,** mechanical assistant at Chicago, will succeed Mr. Hartman as mechanical superintendent of the Santa Fe's Coast Lines in Los Angeles.

Samuel E. Bowler, named to the executive sales and engineering staff of EDWARD VALVES, INC., East Chicago, Ind.

Dr. George W. Vinal, named engineering consultant and adviser to the ELECTRIC STORAGE BATTERY CO., Philadelphia. Dr. Vinal recently retired as chief of the National Bureau of Standards' electrochemistry section after more than 42 years with the government.

Larison H. Taylor, appointed assistant manager of operations for GENERAL ELECTRIC SUPPLY CORP., Bridgeport, Conn. Mr. Taylor was a former assistant to the manager of marketing, Appliance & Merchandising Dept. He has been with the company for 25 years.

Leon A. Patt, formerly division manager, Ontario plant of the CANADIAN CARBORUNDUM CO. LTD., named general manager.

Henry L. LeMay, appointed Chicago district manager by the MID-WEST ABRASIVE CO., Owosso, Mich.

Scott Carpenter, vice-president in charge of a loaning division of the National Bank of Detroit, and **Frank W. Donovan,** a partner in the law firm of Goddard, McLintock, Fulton & Donovan, were elected to the board of directors of SOSS MFG. CO., Detroit.

Norman J. Elder, named manager, Calender Div. of ADAMSON-UNITED CO., Akron, Ohio. **Harold P. Lamb,** appointed manager of product engineering; **R. C. Seanor,** chief engineer; and **G. S. Andrus,** senior engineer.

Floyd V. Snodgrass, general manager, Nordstrom Valve Div. of the Rockwell Mfg. Co., Oakland, Calif., elected president of the CALIFORNIA METALS TRADES ASSN.

H. S. Sizer, assistant to the director of design, Brown & Sharpe Mfg. Co., Providence, R. I., elected to the board of directors of the AMERICAN STANDARDS ASSN., New York.

Leon Gachman, of St. Louis Waste Material Corp., Fort Worth, Tex., elected president of the Gulf Coast chapter of the INSTITUTE OF SCRAP IRON & STEEL, Washington, succeeding **Myer Shosid. Cyril Coguenhem,** of Luria Bros. & Co., Houston, was advanced from second vice-president to first vice-president; **Israel Rosenfield,** of Liberty Iron & Metal Co., Dallas, formerly secretary and treasurer, made second vice-president. **I. Proler,** of City Junk & Supply Co., Inc., Houston, elected secretary-treasurer and **Marx Fuerst,** of A. Marx & Sons Co., Inc., New Orleans, third vice-president.

OBITUARIES

A. J. McFarland, 67, president of Wheeling Steel Corp., Wheeling, W. Va., died Nov. 28.

A. H. Woodward, 74, chairman of the board of Woodward Iron Co., Woodward, Ala., passed away recently.

J. Donaldson Nichols, 66, president of the Cambridge Street Metal Co., Allston, Mass., died recently.

Ray A. Godfrey, 61, vice-president of Republic Structural Iron Works, Cleveland, passed away recently.

Joseph A. Ashwell, 64, former purchasing director, New Departure Div. of General Motors Corp., Detroit, died recently.

Julius Engle, 75, owner and operator of the Engel Plumbing Mfg. Co., Syracuse, N. Y., died recently.

Gordon Webster Burnham, 80, former executive vice-president of the American Brass Co., Waterbury, Conn,. died recently.

Frank T. McQuillin, 58, vice-president in charge of production at Standard Buffalo Foundry, Inc., Buffalo, passed away recently.

Bennet Bronson, 62, administrative vice-president of Scovill Mfg. Co., Waterbury, Conn., died Nov. 23.

W. Bradford Hill, 64, manager of manufacturing, Refrigerator Div. of General Electric Co., Schenectady, died Nov. 22.

YOU'LL NEED A *Pension Architect* Too!

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On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

K-F seeks RFC loan to warehouse cars for dealers . . . Detroit wage rate jumps 3¢ per hr . . . Salvage efforts pay big dividends . . . Conversion steel strong in steel procurement.

By WALTER G. PATTON

K-F Stockpiling Loan—A result of the Washington policy of indirectly restricting automobile production was evidenced last week when Kaiser-Frazer applied for a $38 million loan. If granted, the loan will be used to warehouse cars for K-F dealers.

Sources close to K-F have indicated that the present program is not made necessary because of large stocks of cars *now* in the hands of K-F dealers. Admittedly, car sales have been slowing up. The argument for the loan is this: Independent car makers are in no position to stockpile cars as do bigger firms with their own finance companies. If auto output is going to be cut back and the K-F organization is to be held together for a substantial defense contribution—it will need some stockpiling help—just like the government. Political pressures against the loan are strong.

Cost of Living Increase — Now that GM, Ford and other firms have boosted the pay of 600,000 auto workers 3¢ an hr to match the climbing cost-of-living index, it can be expected that wage pressures will begin to rise again all along the line to keep pace with the GM-Ford increase. The increase stems from a jump of 2.3 points in the cost-of-living index which reached an all-time high of 174.8 during the quarter ended Oct. 15.

In addition to wage earners approximately 125,000 white collar workers in U. S. auto firms will receive an equivalent increase in salary. Biggest single group affected is GM which has 437,000 plant and white collar employees. The 80,000 GM salaried employees will receive an additional $15 per month or a total of $55 for the period between Dec. 1, 1950 and Mar. 1, 1951. This allowance will be paid next March—just in time for the Income Tax Collector.

Some Changes Made—More than half of the cars being produced today are 1951 models. As predicted in THE IRON AGE several months ago, styling changes have not been extensive. Kaiser-Frazer and Packard have introduced completely restyled jobs. The Chrysler changes are expected to be extensive. A new General Motors body will shortly be introduced. Most of the styling changes have been in smaller body details.

Basic dies have not been replaced on a large scale. There have been many changes in restrike dies which give an entirely new appearance, for example, to a window opening, the hoodline above the grille or decorative trim. Some forming dies have become tremendously complex. For example, one manufacturer is forming two bumpers at once. Many inserts are used in the dies. The cost of this tooling alone runs well over $100,000.

Buick Achieves Goal—Buick has already reached its production goal of half a million cars in 1950. With a present plant capacity of 550,000 cars a year the company has hopes of making this an annual accomplishment. Construction of a new manufacturing plant north of the present factory and a large addition to its foundry will nearly double the present capacity, according to Ivan L. Wiles, Buick general manager.

Conservation Measures — Salvage engineers in Detroit have put in some busy postwar years. With steel in short supply, unusual measures have often been adopted to stretch available materials. One auto plant, for instance, is reusing about 22 pct of its sheet clips. Applications for the reclaimed steel include washers, caps, flanges,

brackets, cover plates and a multitude of small parts. By reworking its sheet scrap, the company figures it is able to make about one extra car for every 50 produced.

Important changes have been made in plating departments, according to *Automobile Facts*. In one case, a method has been devised for reclaiming the chemical used in a chrome-plating process. As a result, chromic acid consumption has been cut by 90 pct. Ordinary gravel is being used for deburring certain small castings, replacing an expensive special stone. Estimated annual savings from this change alone total half a million dollars.

Conversion Steel Scramble—Material shortages in the automobile industry have already been responsible for the introduction of many buying practices by the industry which were unheard of during the prewar era. Prior to 1941, Ford was the only automobile producer associated with so-called "conversion" steel. Today, the entire auto industry is buying "conversion" steel—often at $300 per ton or more.

Substantial quantities of pig iron are being imported from Europe. The industry is currently engaged in a frantic search for nickel substitutes. For some plating applications, aluminum paint will undoubtedly be used. Steel mills are so anxious to obtain scrap that clips and turnings are earmarked at the dealers and even small manufacturing plants for direct return to a specific steel mill.

May Drop Conversion — Some automobile sources have ventured the prediction that the present tightness in steel could do a flip-flop almost over night. Their argumen runs like this: Once top automobile executives are convinced that automobile production will definitely be cut back and that conversion steel will not be required for war production, they may drop their conversion plans almost overnight. It is estimated that more than 30 pct of the steel used by the motor car industry is high cost conversion steel.

Natural Gas Diesels — Detroit Diesel Engine Div. is offering an adaptor which makes it possible for its series 71 Diesel engines to burn natural gas as well as Diesel fuel. The changeover of trucks in service can be made quickly using a factory-engineered kit. The installation does not interfere with operation of the unit as a straight Diesel fuel engine. This feature will be welcomed particularly by buyers who operate their units in natural gas areas.

The dual-fuel unit has no electrical ignition system. Natural gas is delivered to the cylinder and fired by a small charge of Diesel fuel at the top of the compression stroke. An automatic shutoff valve shuts off the flow of gas when the engine is not in use.

Power Plant Combinations — Ford is offering its 1951 model buyers a choice of three transmissions and two engines — 6 power combinations in all. The new automatic drive, combines a torque converter and a planetary gear train, which provides three forward speeds and one reverse. The car starts normally in the intermediate ratio. Shifts between 17 and 65 mph are automatic and depend on accelerator pressure.

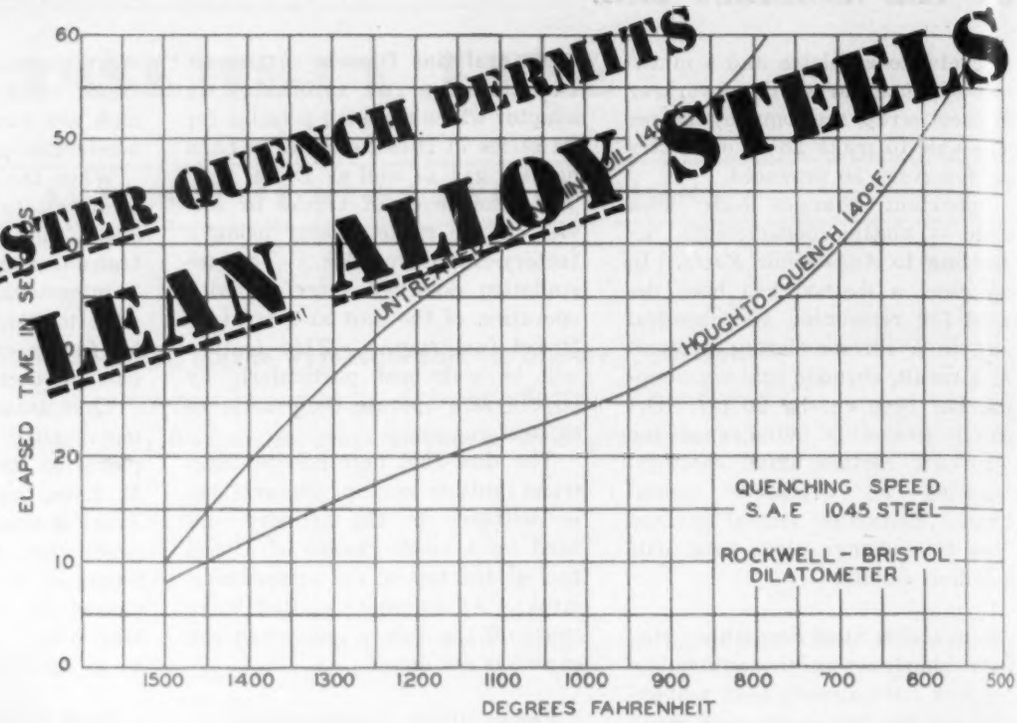
When the motorist is attempting to negotiate a hard pull and car speed falls to 20 mph, the Ford transmission returns automatically to intermediate gear. It is also possible to "kick-down" the accelerator for an extra burst of power to pass another car.

The amazing vitality of the motor truck market found an explanation last week when Roger M. Kyes, general manager of GMC Truck & Coach Div., announced the production of 100,000 non-military trucks so far this year. GM Truck passed its 1948 record output on Nov. 6 and has 5 weeks production to go this year.

Ford Follows Trend — Styling changes in the 1951 Ford follow the trend of the industry. The hood is lower. The new Ford models have dual-spinner grilles. Bumpers are wider. Several deluxe models have added chrome but some plating has been removed from the standard jobs.

THE BULL OF THE WOODS — By J. R. Williams

THIS FASTER QUENCH PERMITS USE OF LEAN ALLOY STEELS



YES, history is repeating itself. The demand again is for lean alloy steels, to save chromium and nickel. ★ But how can high tensile and yield be assured if we go back to wartime steels? ★ The answer is in the quench. An oil which assures a faster rate of quenching speed will mean the difference between exceeding physicals and just missing them. ★ Houghton has a complete series of treated quenching oils, including HOUGHTO-QUENCH, which possesses unusually high quenching speed... the long-popular, ever-stable No. 2 Soluble Quenching Oil for general heat treating... and MAR-TEMP Oil for hot quenching to avoid distortion. ★ Every "oldster" knows Houghton for its heat treating service and experience. Consult us on your quenching problem. E. F. HOUGHTON & CO., Philadelphia 33 and most principal cities.

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HOUGHTON'S QUENCHING OILS

WEST COAST PROGRESS REPORT

Digest of Far West Industrial Activity—By R. T. REINHARDT

No Surprises — Price increases announced last week by U. S. Steel came as no surprise to steel users. However, the trade was agreeably surprised by the modest increases of from $5.00 to $6.00 a ton announced by the corporation's Columbia Steel Co., and the $4.00 to $6.00 per ton increase announced by Geneva in Utah.

Although late last week independent western producers had not announced increases they generally reported that they were "studying" both the labor pattern and price increases which they believe essential to meet such increased costs of production.

New Warehouse Prices—Western warehousemen were generally expected to announce new price schedules earlier this week and there is some reason to believe that these prices will be on different bases than have previously prevailed. Under consideration late last week by some warehouses was the possibility of passing on the full price increase on smaller quantities but absorbing some of the increase on larger quantities.

Back in Blast—Bess No. 1 blast furnace at the Kaiser Steel Corp. plant at Fontana, Calif., is scheduled to be put under blast about Dec. 10 after a shutdown of approximately 1 month because of a breakout. The 1200 ton per day production of this furnace will be of considerable assistance in relieving the heavy demands for scrap the high operating rate of this plant has made on the southern California market.

Utah Needs Gas—Greatest single encouragement to industry in Utah would be a natural gas supply for industrial users, is the opinion of the Pacific States Cast Iron Pipe Co., which has a plant near Ironton blast furnace of Geneva Steel Co.

Company management placed natural gas at the top of a list of relevant conditions affecting industrial development of the state in response to a request for a practical appraisal from the Bureau of Economic and Business Research of the University of Utah.

Electric Power OK—The company rates electric power as satisfactory, both from the standpoint of service and cost, and the labor force as above average. It describes taxes as "severe" but adds that this factor is no more burdensome in Utah than in most other states.

The cry of this, and other industries in the state, for natural gas is particularly pertinent at this time inasmuch as the application of the Utah Natural Gas Co. for permission to build a line from the San Juan basin field to Salt Lake City will be heard by the Utah public service commission the middle of December.

Where There's Smoke There's Fire—Investigation of smog conditions in Los Angeles by the California State Legislators Committee headed by State Assemblyman Randal F. Dickey, last week developed almost fire and smoke.

Gray iron foundrymen who have been harassed and restricted by the stringent regulations of the Los Angeles County Air Pollution Control District accused that organization of inefficiency and incompetence.

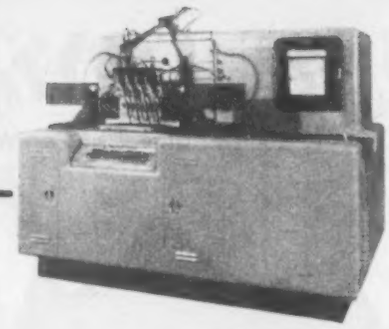
To Start Harvey Plant—Within 30 days construction of the 140-pot line aluminum production plant of Harvey Machine Co. will be started at Kalispell, Mont., according to M. E. Darkenwald, assistant to the president.

This is the first unit of what the company expects eventually to be a $50 million operation involving a rolling mill and other facilities, as well as an increase to a nine-pot line reduction operation.

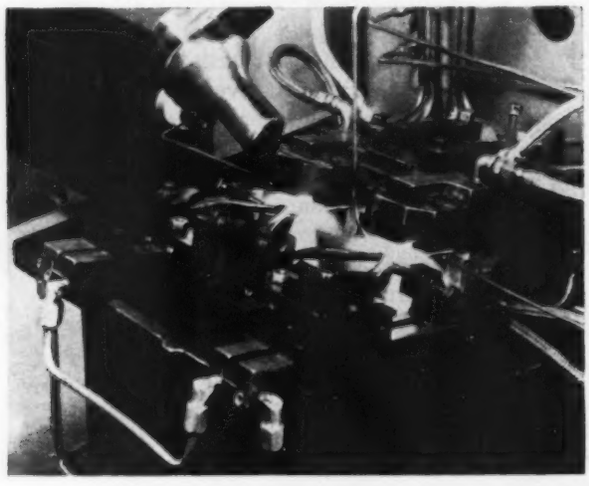
Harvey Machine has purchased one pot line of 140 units from the government, and with power assured temporarily through the Montana Power Co. and later from the BPA will be able to produce approximately 18,000 tons of aluminum per year.

American Can to Build—American Can Co. last week announced construction of a new plant at Stockton, Calif., which will have a capacity of 350 million containers per year.

kraeuter keeps the edge



with flamatic hardening



Flamatic hardening of plier cutters by Kraeuter & Co., Newark, N. J. Process duplicates hardness pattern shown in red above.

To the long list of proven applications for Flamatic Hardening (gears, cams, etc., up to 8 inches in diameter . . . spindles up to 36 inches long) you can now make another important addition: **cutting edges.** Here's an interesting case! Cincinnati Flamatic Hardening provides Kraeuter & Co. pliers harder, longer-lasting cutting edges—routinely, uniformly, economically, and on a high production basis. Operator loads pliers on holding fixture, then merely presses a button. High temperature flames heat selected areas of the cutting edges to specified temperature electronically controlled, then pliers drop into conveyorized oil quench tank . . . For prompt recommendations on how Cincinnati Flamatic Hardening may help you, send a sample part or blueprint for analysis.

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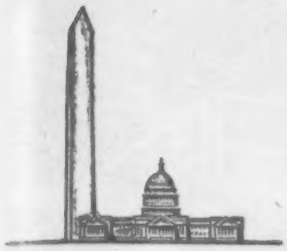

THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

By EUGENE J. HARDY

Price Controls Soon? ? ? — The appointment of ex-mayor M. V. Disalle of Toledo as Director of Price Stabilization, the sudden worsening of the war in Korea, and the signing of a new steel contract have all combined to start price control rumors flooding Washington again.

ESA officials are talking about selective controls soon, perhaps within a few weeks. The commodities considered are copper and iron and steel scrap. Controls would gradually spread to other key metals and finally there would be a comprehensive system.

Slow Freeze — It is hoped to avoid a general freeze which caused OPA so many headaches, but rather to institute controls selectively across the board. However, if the world situation requires a freeze this will be the course of action regardless of administrative headaches.

The Administration is still concerned over the Defense Production Act requirement for stabilization of wages when prices are controlled. It would like to get rid of this provision. But even if an attempt to stabilize wages is made there is still the knotty problem of what to do about union contracts containing escalator clauses based on the Labor Dept.'s cost-of-living index.

Symington vs. Harrison — Still undecided is whether to permit manufacturers to use aluminum, copper, etc., remaining after NPA cuts go into effect for whatever civilian products they choose or to institute end-product limitations.

NPA Administrator Harrison wants to avoid limitation orders as long as possible, although realizing that they will eventually be necessary. NSRB chairman Symington believes scarce materials should not be used for juke boxes, toys, gadgets, etc., but that more-essential items should have first call on available supplies.

Some NPA officials agree with Symington. A list of items for which copper could not be used is making the rounds of NPA. A similar list was prepared for aluminum, but industry protests resulted in the list not being incorporated in a formal order. It's only a matter of time before limitation orders are part of the control scheme.

NPA on the Griddle — NPA is rehearsing for what may turn out to be its first ordeal by fire on Capitol Hill. The Senate Small Business Committee has invited NPA officials to explain its reasons for acting in each area of regulation.

Some questions are: Are DO orders being handed out by the government too freely? Is the aluminum cutback working too great a hardship on "civilian" fabricators? Was it necessary to cut civilian copper usage by 15 pct or, should it have been cut further?

So far, NPA has had clear sailing at the hands of Congress. A number of senators feel the agency will come off on top in its initial brush with the law-makers. It's just a case of the solons exercising their right to confront the bureaucrats with the squawks received at the Capitol from people affected by controls.

Steel Report — A forthcoming congressional report on steel is going to hang up some kind of a record. Here's the eye-opener: The report will refrain from telling the industry how to run its business. For more than a year now, a "monopoly investigating" subcommittee headed by Rep. Celler, D., N. Y., has been indulging itself in public hearings calculated to air the "facts" of "monopoly" in the U. S. steel industry.

Due largely to solid Republican opposition on the Celler subcommittee the report will avoid conclusions or recommendations.

The report is now scheduled for release within the next couple of weeks. The fact that it will refrain from criticism of the industry is unusual, but it brings to light a truism known only too well to steel men in close contact with Washington—that in time of war the government is only too happy to have the benefits of a system it sharply criticizes in times of peace.

"Here's another improvement in putting tin on Inland steel"

"I'm Bill Swisshelm, electrolytic foreman in Inland's tin plate department. I've helped Inland make tin mill products for 14 years. As long as I can remember, there's been a constant effort to keep product quality at the top. Now with the addition of this second electrolytic tinning line our facilities are vastly improved. And that goes for the tin plate we make on this line too."

Here again, is an example of Inland's continuing effort to improve its product and expand its plant. Steel users in the midwest can put their confidence in Inland as a dependable source of quality steel products.

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SUPER High-Speed Steels

Set New Production Record

By P. LECKIE-EWING
Metallurgist,
Union Twist Drill Co.,
Derby Line, Vt.

Greater wear than standard high speed and higher toughness than cast alloys and carbides justify the extra cost of super high-speed steels. Greatest efficiency is obtained at feeds about twice as great as with standard high-speed tools, increasing production. Hot hardness is 20 to 30 pct greater than for standard grades.

IN recent months there has been considerable interest in the high alloy, high wear type of high-speed steel. These super high-speed steels are in some cases a new development, but in general are adaptations of analyses which have been known for many years. All these steels are characterized by a high alloy content, especially of cobalt and/or vanadium, frequently coupled with a high carbon content which in one case reaches 1.5 pct.

With the advent of jet engines and various new production techniques, highly abrasion-resistant high-speed steels became not only desirable but essential, justifying their extra price. In many cases these steels are setting production records on standard items and cutting hitherto unmachinable material at production rates. By their very nature, however, the super high-speed steels are somewhat more brittle than standard high speed. They are more difficult to machine, and particularly more difficult to grind.

Feed Increased For Efficiency

The machinability and grindability alone, to say nothing of the higher cost of the steel itself, make the tools made from these steels somewhat more expensive. They find their greatest use in special applications where standard high-speed steel does not prove satisfactory because of low wear, or where cast alloys and carbides are unsatisfactory because of low toughness. The characteristics of the steels are such that they are most efficiently run at about 1½ to 2 times the feed of the standard high-speed tools.

To simplify description, manufacturers' trade names of the various grades of steel are omitted. Instead, the Automotive system of tool steel identification is used, as shown in the accompanying table. T-1 and M-2 are standard 18-4-1 and 6-6-2 high-speed steels respectively, included for comparison.

In addition to this list, there are numerous

molybdenum high-speed steels containing cobalt in similar amounts to the T-4, 5, and 6 tungsten-cobalt steels. These steels, however, as well as several others of the general super high-speed type, are not too well known and are not included in this brief discussion. The principal metallurgical properties of these steels which are important to the potential user are red hardness, wear resistance and toughness.

Red hardness refers to the ability to resist the softening effect of high temperatures such as are generated in various heavy cutting operations, particularly with lathe tools. A steel with high red hardness will remain hard at higher temperature than a steel with low red hardness, and will therefore possess greater cutting ability in certain applications. Fig. 1 shows graphically the red hardness of several of the super high-speed tools compared to that of standard T-1 and M-2 grades. For further comparison, results for SAE 1035 steel are also included.

Red Hardness Increased 20 Pct

The super high-speed steels have up to 20 to 30 pct greater red hardness at the temperatures shown than the standard T-1 and M-2 grades. This effect explains in part the greater life obtained from the super high-speed steels in operations where high red hardness is required, that is, where the cutting edge of the tool operates at red, or near red, temperatures.

Many of the applications for which these steels are suited involve conditions of extreme wear rather than high temperature. In these cases, it is better to use the high carbon-high vanadium steels such as T-3, T-15, M-3 and M-4 rather than the high cobalt grades. This is because wearability is governed first by the overall hardness of the tool and secondly by the hardness and number of the carbides which are distributed throughout the matrix. The high-carbon high-speed steels can all be hardened from 1 to 3 points Rc harder than the standard grades and therefore possess potentially greater wear resistance.

COMPOSITION OF SUPER HIGH-SPEED STEELS

Trade Designation	C	W	Mo	Cr	V	Co
T 1	0.72	18.00	.....	4.00	1.00	.....
T 2	0.82	18.50	.....	4.20	2.25	.....
T 3	1.05	18.00	.....	4.20	3.00	.....
T 4	0.80	18.00	.....	4.30	1.00	5.00
T 5	0.80	18.50	.....	4.00	1.75	8.00
T 6	0.80	20.00	.....	4.00	2.00	12.00
T 15	1.50	12.50	.....	4.75	5.00	5.00
M-2	0.83	6.25	5.00	4.20	2.00	.....
M-3	1.00	6.25	6.25	4.00	2.40	.....
M-4	1.25	5.50	4.50	4.50	4.00	.....

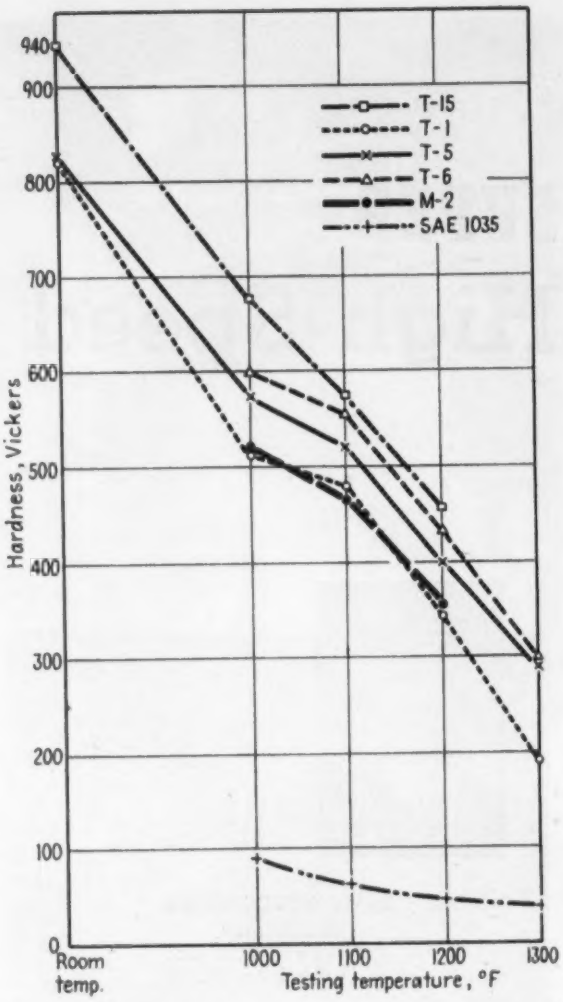
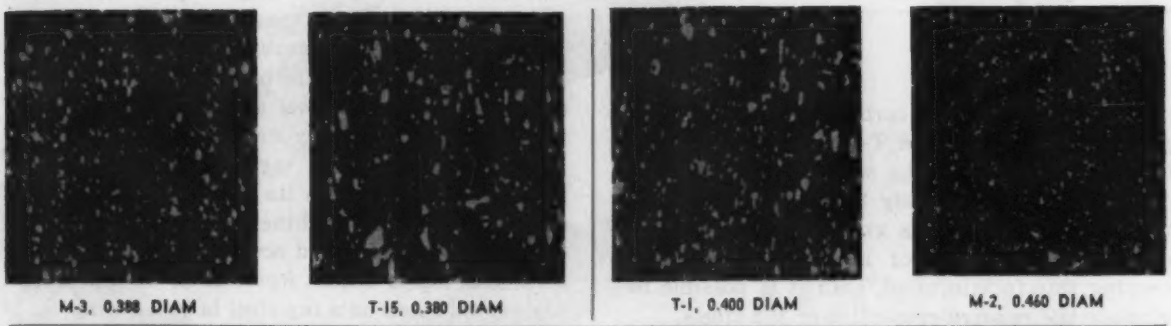


FIG. 1—Comparison of hot hardness of various standard and super high-speed steels. The latter show marked superiority in this respect.

In addition, there is a much greater quantity of carbides in the high-carbon high-alloy steels, as seen in Fig. 2. These high-alloy carbides are themselves considerably harder than the carbides in the lower alloy standard grades of high-speed. The hardest carbides reported are those found in T-15 steel. However, some of the high wear steels of different analysis do not possess large enough carbides to obtain microhardness readings; hence, their relative hardness must remain at present a mystery. Fig. 3 shows the microhardness of carbides and matrix for the super high-speed T-3 and the standard T-1 high-speed.

An important property of all tool steels is toughness, or the resistance to edge chipping and/or complete breaking under conditions of use. It is in this respect that the super high-speed steels must be adopted with caution, since their toughness is generally lower than that of the standard grades of high-speed. The brittleness of the super high-speed steels is a natural corollary of their high hardness and abrasion resistance.

It is axiomatic that the toughness of high-speed steels decreases as the hardness increases. Consequently, the T-15, T-3, and M-4 types in



M-3, 0.388 DIAM | T-15, 0.380 DIAM | T-1, 0.400 DIAM | M-2, 0.460 DIAM

T-5, 1¾ DIAM | T-6, 1⅞ DIAM | T-15, 1⅜ DIAM | T-3, 1¾ DIAM

TYPE	QUENCH, °F	TEMPER, °F	HARDNESS, Rc
M-3	2175	1025	65.5
T-15	2275	1025	67
T-5	2320	1050*	66
T-6	2320	1050*	66.5

*Double temper.

TYPE	QUENCH, °F	TEMPER, °F	HARDNESS, Rc
T-1	2320	1050	65
M-2	2225	1050	65.5
T-3	2275	1025*	67.5
T-15	2275	1025*	67

FIG. 2—Microstructures and the heat treatments used to produce them in various standard and super high-speed steels. M-3 type shows a fine carbide distribution, comparing favorably with that of the M-2. The high cobalt steels T-5 and T-6 have massive carbides which, with coarser grain size, produce a tendency toward brittleness. The larger diam T-15 and T-3 both have large angular carbides. Note difference in carbide size and distribution of the T-1 and M-2 steels. Etched 1 min, 2 pct Nital. 450X.

particular, which are regularly used at hardnesses of 67 to 68 Rc, are expected to possess lower toughness. Furthermore, a large grain size in the hardened steel means low toughness. The cobalt grades in particular (T-4, T-5 and T-6) are prone to low toughness; this is because the intercept grain size developed by these steels is from 4 to 5 numbers lower than corresponding sizes of the standard high-speed steels. The M-3 type, however, regularly develops grain sizes finer than that of standard high-speed grades in equivalent sizes.

Cobalt Cuts Impact Strength

Fig. 4 is compiled from a recent paper by Grobe and Roberts in which the impact strength of various grades of high-speed steel were compared. The high cobalt grades (T-4, 5 and 6) are shown to develop lower impact strength as the cobalt content increases. Also, the impact strength for all grades reported changes little with an increase in hardness from 62 to 65 Rc. It is interesting to note that the super high-speed M-4 possesses as high impact strength as that of standard T-1.

It cannot be emphasized too highly that laboratory physical tests should only be used as a guide to the selection of the correct steel. Many tools are giving excellent service today which have, metallurgically speaking, comparatively poor physical properties. This is particularly evident with certain lathe tools which are deliberately overheated and coarsened (thereby losing toughness) in order to secure maximum red hardness. Since toughness is always obtained at the expense of hardness or wear resistance, it is obvious that what is required is not high bend strength, high impact strength and high torsional strength, but only sufficient toughness for the job.

It is impractical if not impossible for any laboratory to determine such a vague term as sufficient toughness for the job in terms of the impact, bend or other precise laboratory test, particularly since the same job in different shops may actually operate under much different conditions. One should not attempt therefore, to transfer directly, precise laboratory tests to relatively unpredictable service conditions. On the other hand, however, a thorough knowledge of laboratory test results is an indispensable aid in the selection of the most favorable analysis for certain conditions.

Fig. 2 shows the hardened and tempered microstructure of several similar sizes of super high-speed steels. These structures should be compared with those of standard T-1 and M-2. The structures shown will offer some further explanations of the high wear and lower toughness of these steels.

A particularly interesting comparison in this regard is that the amount of carbides and the

size of the individual carbides are very much greater in the T-15 and T-3 steels than in the T-1 and M-2 steels. The size, amount and distribution of the extremely hard and brittle carbide particles affect to a great extent the wearability and toughness of all high-speed steels. Keeping this fact in mind, then it is possible to estimate the relative properties of the steels.

Heavy concentrations of large carbides in the T-3 and T-15 steels tend to give these steels ex-

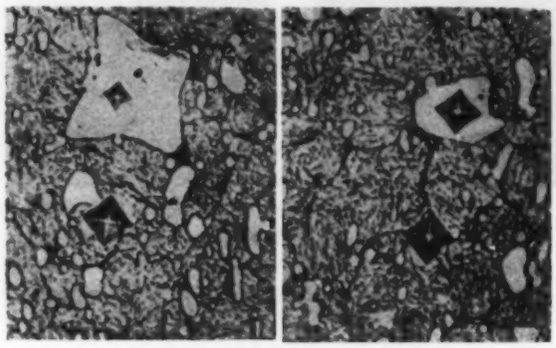


FIG. 3—Microhardness in the carbide of (A left) super high-speed grade T-3 reached 84 Rc, while the matrix was 66 Rc. Microhardness of (B right) the standard high-speed grade T-1 was 75 Rc in the carbide and 65 Rc in the matrix. 1000X.

ceptional wear but somewhat lower toughness. The structure of the M-2 steel might be mistakenly thought to indicate few carbides. Actually, this steel possesses more carbides than the T-1 steel but they are so small and evenly distributed that they are not clearly visible at this magnification. This type of structure apparently results in equivalent wear to the T-1 steel, but will develop greater toughness.

Fig. 2 clearly compares the difference in carbide distribution and size of the T-15 and M-3 grades in small sizes. The fine distribution of the M-3 carbides results in a very fine grain size giving high toughness, while the wearing qualities of the two steels do not differ appreciably.

The effect of section size on carbide size is shown when comparing the two samples of T-15 steel. Apparently, the reduction has broken up the carbides in the 0.380-in. diam stock to a decidedly greater extent than that seen in the 1⅜ in. round. Theoretically, this should make a tougher steel with equivalent wear resistance. However, the effect of tool design and operating stresses generally result in the smaller sizes acting in a comparatively brittle fashion. The reduction, while generally reducing the size of the individual carbides, also tends to pack them closer together. The net effect is that small sizes of the super high-speed steel tend to break rather easily in use.

The super high-speed steels do not have the red hardness nor the wearing qualities of either carbide or the cast cutting alloys. However, owing to their greater toughness, they will perform jobs well where carbide or cast alloy will fail, owing to chipping or breakage. Drills made of super high-speed steel are in production use where similar cast alloy drills have failed.

Drills and taps are very infrequently made from carbide, owing to its brittleness. In some cases with special machine tools, carbide tipped drills are successful and occasionally for plastics a carbide tap is used. Application of the super high-speed steels as a tap steel is broadening.

For uses such as form and single point lathe tools, carbide and the cast alloys will outperform the super high-speed steels by a considerable margin. But where toughness is a factor as in taps, drills and certain form cutters, the superior wear and red hardness of these steels make them the most economical choice. A few carbide hobs have been built, but owing to their enormous cost and difficulty of regrinding, the super high-speed steels are again the economical choice.

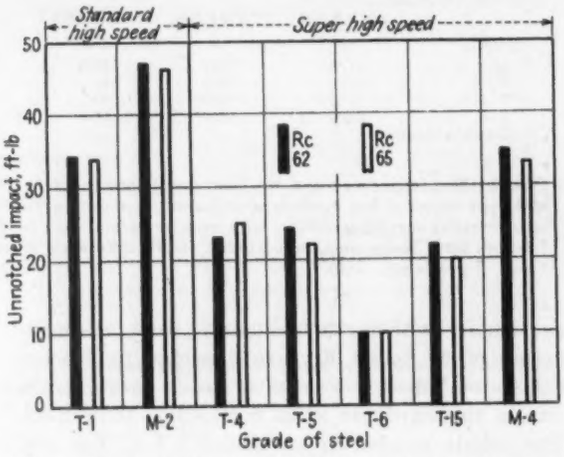
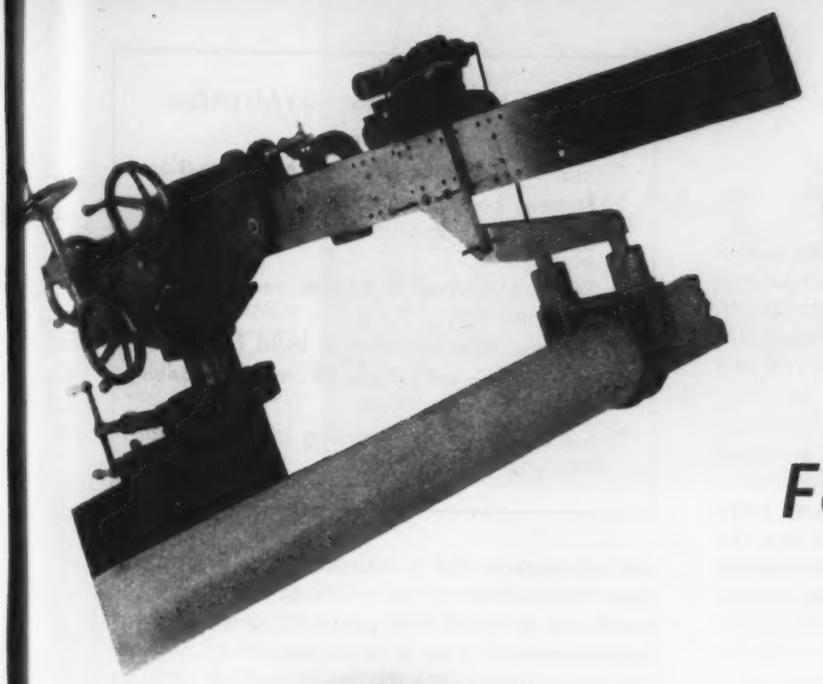


FIG. 4—The high cobalt T-4, T-5 and T-6 develop lower impact strength with increased cobalt content, as shown above. The M-4 grade of super high-speed has impact strength as high as the standard grade T-1. Data from Grobe and Roberts.

One successful application of the T-15 grade was a form ground hob, 0.4444 normal circular pitch, 15° pressure angle, which completely machined a piece of AISI 4342 steel at 446 Bhn, 5 in. diam and 20½ in. long, in 21½ hr at 0.030 feed and 22 rpm. The second piece was machined in 17 hr at 0.030 feed and 34 rpm. Conventional hobs under similar conditions did not complete 1/3 of the part before sharpening was necessary.

A 0.550 in. diam T-15 end mill, cutting cast iron, was run at 182 fpm and 14 in. feed. Finish and life were good. Conventional end mills could not be run over 90 fpm and 5½ in. feed. In another case, a 17/64 in. heavy duty drill, run at 150 fpm in cast iron, produced 3844 and 6505 pieces per grind. Conventional high-speed drills could only produce 500 pieces per grind. These examples indicate what results may be obtained from the super high-speed steels when properly applied.



Optical Tooling

Faster More Accurate

By GEORGE ELWERS
Machinery Editor,
The Iron Age

Tooling for aircraft production will benefit from new faster, more accurate construction method for assembly fixtures. Optical method of alignment of fixtures also has potential machine tool and other industrial applications.

A NEW method of constructing large aircraft assembly jigs and fixtures, which saves time and money and is far more accurate than previous methods, has been developed by the Republic Aviation Corp. (See THE IRON AGE, Nov. 23, p. 83.) Though developed for the aircraft industry under Air Force contract, some of the equipment and methods are expected to find wide application in other industries.

Republic has combined an optical method of setting up large fixtures with a simpler and more flexible method of erection. Fixtures produced by the new method are lower in cost, may be knocked down for transportation and reassembled without loss of accuracy, and do not require highly skilled personnel in construction. And most important, they can be built to an accuracy which has not been practical before except when master models were used.

By eliminating the need for masters, the new method saves the aircraft industry a lot of headaches, and will greatly facilitate mobilization in the event war forces a sudden expansion of aircraft production.

In rapid mobilization, the aircraft industry farms out a lot of its work. Two or more small manufacturers may take over making wings for a given plane. Others will make fuselage sections, others tail assemblies. All this work requires large assembly fixtures. There has been, in the past, no practical method of setting up these fixtures from drawings alone with enough accuracy so that anybody's wing, or tail, or fuselage section would be interchangeable with anybody else's. Practical methods of measurement over large spans just weren't accurate enough. So, it was necessary to make a master model of each part. The master was then shipped around to various plants so everybody could make his fixtures from it. That way, all fixtures were the same size. They might not be completely accurate according to the drawing, because the master can't be made much more accurately than a fixture, but they'd all be essentially the same size.

A master thus became a highly valuable piece of property. It was expensive and time-consuming to ship it around to subcontractors, and the risk of damage in shipment was high. And if

fire, bombing, sabotage, or any other cause were to destroy or seriously damage a master, the result would be very serious impairment of the construction program for its particular airplane. So the passing of the master will be unmourned.

Features of the new construction method are an optical method for alignment of fixtures, and a construction method using standard pipe and castings. The method is based to some extent on equipment and procedures developed in England and Germany, but Republic has brought it to a point where it is simpler, cheaper and more accurate than any previous means of doing the same job. Fixtures were formerly weldments, with alignment done by the familiar wire, plumb line, and transit method.

Reference Line Is Light Beam

The optical method of setting up a fixture is based on the use of a beam of light as a reference line for locating points on the fixture. Two primary instruments are used. One is an aligning telescope. The other, called a collimator, is a tube containing a light source, lenses and two reticles used as sighting targets. The mechanical heart of the system is a universal positioner used to locate fittings on the fixture in their proper position with reference to the beam of light.

Based on German castings brought over after the war, Republic has designed a variety of sizes and shapes of castings with which standard piping can be assembled into any type and size of fixture. Construction is simply a matter of assembling the proper pipe and castings into a frame. Spotted at the proper locations on this frame are bolted-on castings for support of the fixture fittings. These fixture fittings are the actual points of connection between the fixture and the aircraft part to be assembled on the fixture. Other castings are used as bases for the fixture, as braces, and as brackets for the optical instruments.

One of the main problems in developing the standardized type of fixture was that of providing adjustment for positioning the fixture fittings without the use of shims or relocating the previously installed fitting support castings. This was accomplished by a novel method of anchoring the fittings to the fixture by casting them in place.

Retainer cups are built into each fitting support casting. Corresponding extensions on the fitting project into these cups when the fitting is in proper position. These extensions are tubular, with holes in the tube walls, and are smaller in diameter and depth than the corresponding cups.

Once the fitting is properly located with respect to the fixture frame, it is anchored by filling the cups with molten Cerrotru, a tin-bismuth alloy which expands as it solidifies. This provides a rigid bond between the extension on the fitting and the cup on the fitting support casting.

Designer Sets Beam Location

Construction of a fixture begins with the usual mechanical drawing. On it, the tool designer indicates the desired location of the reference beam of light. In the event that the distance between the light beam and some of the fixtures will be beyond the range of the positioner, auxiliary reference beams may be indicated. The tool designer also designs positioner adapter plates for each fitting.

The main fixture structure is then assembled

OPTICAL TOOLING ADVANTAGES

1. Reduces cost of fixtures.
2. Improves accuracy of fixture construction.
3. Fixtures can be knocked down for transportation, reassembled without loss of accuracy.
4. Erection method is simpler, requiring less personnel skill.
5. Reduces time required to build fixtures.
6. Eliminates need for use of master models in fixture construction.
7. Facilitates subcontracting in national emergency.

CONSTRUCTION TIMES FOR TEST FIXTURE

OLD METHOD Welded Structure, Alignment by Wire, Plumb Line and Transit Method: Detail Manufacture and Erection	Manhours
Cut and fit pipe	65.0
Manufacture mounting pads	6.0
Manufacture angles and plates	10 0
Weld structure	10.0
Install and align fittings	24.0
Total fabrication and setup time	115.0

NEW METHOD Bolted Casting Structure, Alignment by Optical Method: Detail Manufacture and Erection	Manhours
Manufacture six fittings	7.5
Manufacture one adapter plate	5.0
Manufacture four shelves for instruments	8.0
Cut and fit pipe	8.0
Erection of structure	20.0
Install fitting support castings	4.0
Install fitting retaining cups	2.0
Establish two reference lines of sight and install and align fittings	14.5
Total fabrication and setup time	69.0

LINEAR DISTANCE to fitting is located from a button on the telescope to a button on the positioner collimator, by a sectional rod with micrometer adjustment.

from pipe and castings. Fitting support castings and brackets for the optical instruments are then attached in the proper locations. Exact centering of these is not required; tape measure accuracy is sufficient. This is because the cups are larger than the corresponding fitting extensions, thus allowing for some misalignment.

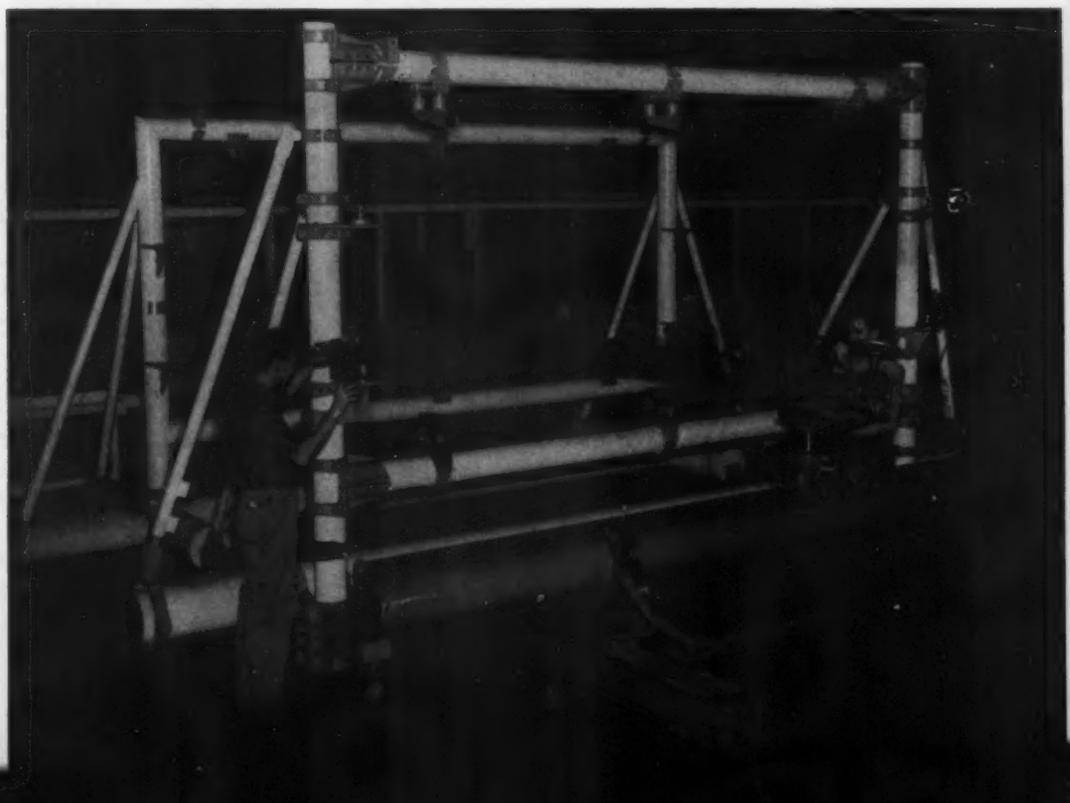
Next the alignment telescope is installed on its bracket. On the bracket at the opposite side of the frame, a collimator or a special target device is installed. By sighting the telscope on the target reticle, the reference beam is established.

Adjustable Positioner Used

Now the universal positioner is brought into use. This is a mechanical device mounted on a movable carriage separate from the fixture frame. It carries a precisely-machined beam and related adjusting mechanism. By means of handwheels, this beam can be moved in any horizontal or vertical plane, or be tilted. The beam is drilled with a series of accurately-located holes, combinations of which may be selected for attaching the fixture fitting adapter plates. An adjustable collimator head is also attached to this beam.

On the fixture fitting adapter plate are matching points corresponding to similar points on the fitting itself. The fitting is clamped to the adapter plate with these points matched. The size and shape of the adapter plate, the combination of holes selected in attaching it to the beam, and the matching points have all been accurately predetermined by the tool designer. So when the fitting has been clamped in place, it is in an exact and predetermined position with regard to the collimator mounted on the beam. The distance between the collimator and the centerline of the fixture fitting can be held within a tolerance of 0.001 in.

Thus the fitting is correctly located with respect to the collimator. The next step is to locate the collimator with respect to the fixture frame. This is done by aligning it with the reference



LOCATING A FITTING on Republic's test fixture. Operator at aligning telescope, left, signals adjustments to positioner operator, right. Fitting is at bottom center attached to adapter plate on positioner. In background is same fixture made by conventional construction method.

beam of light. Sighting through the aligning telescope, an operator compares the target reticle of the collimator with guide lines in the telescope. The positioner adjustments are operated until the reticle is centered in the telescope. The positioner and its attached fitting are then located properly in a plane normal to the line of sight of the telescope. By the same method, using a second reticle in the collimator and with the telescope focused to infinity, correct alignment with regard to tilt is given to the positioner.

Rod Measures Linear Distance

The method includes no optical means by which linear distance from the telescope to the positioner and fitting can be determined. Instead, it is measured between a button on the telescope mount and one on the positioner collimator head, by a sectional rod fitted with a micrometer extension at one end. Efforts to improve this method are being made. Use of dial indicators at each end of the rod is being investigated. The idea of measuring distance with the telescope by triangulation, as a surveyor measures it with his transit, was discarded as not accurate enough and because it requires calculation. A sonic method of measuring distance is being considered.

When the positioner has been adjusted so that its collimator is aligned with the reference light beam, and the distance from the telescope to the collimator is correct, the fitting attached to the adapter plate will be in its proper location with reference to the fixture frame. The tubular fitting extensions will be in the fitting support cups, and the fitting can then be anchored to the fixture by pouring in the Cerrotru.

Accuracy obtainable by the optical method is startling. A fitting can be positioned within 0.0015 in. horizontally or vertically at a distance of 50 ft from the aligning telescope. Tilt at 50 ft can be accurate within 6 sec of arc. An optical square, used when it is desired to produce a reference beam of light 90° from the telescope's line of sight, is accurate within a fraction of a second of arc.

Method Used For B-47

Three years and more than $175,000 went into development of this method at Republic. During its latter stages, work was done under an Air Force contract. Phase I, now completed, culminated in a two-day demonstration of the method last month to production and government officials. Under Phase II of the contract, Republic will continue to investigate the practicability of the method for various applications.

Boeing aircraft has already used the new method in construction of fixtures for the B-47 bomber. The method has also been used by Fairchild Aircraft. Republic will use it in tooling up for its new fighter plane model.

Optical equipment used in this construction method is made in England by Taylor-Hobson, though instruments have also been made for Republic by D. W. Mann, Lincoln, Mass. The universal positioners now in use were made by Republic. Two new positioners are now being made for Republic by the Cincinnati Milling Machine Co., which is also investigating possible machine tool uses of the optical system.

A probable application for the optical system not limited to the aircraft field is in setting of lineshaft bearings. In the erection of large machinery, where sometimes now a surveyor's level is used, the optical method would be faster and more accurate. In the machine tool field, there are many potential applications for the precise measurement made possible by the telescope-collimator combination. Using an optical square, for instance, an extremely accurate check could be made as to whether the table of a knee-type milling machine is square with the column. On any type of machine, particularly in large sizes, a collimator mounted on the table, sighted from a telescope, would be valuable to check whether or not the table moves in a truly horizontal plane. These are only examples; the possibilities are legion.

Optical Method Saves Time

For testing and demonstration of the new method, Republic has constructed a relatively simple test fixture. For comparison purposes, another fixture with the same fittings was made by the conventional method of assembly of pipe, plate and shapes by welding. The bolted casting structure, besides being more accurate than the other fixture, required 46 less man-hours to build. Republic points out that in this case the simplicity of the structure, plus the unfamiliarity of personnel with the new method of construction, favored the welded fixture. Otherwise the time saved would have been greater. The advantage of the new tooling method increases with the complexity of the fixture.

Apparent advantages of the new method are summed up as: Accuracy is greater, the need for a master tool is eliminated, less construction skill is required, fixtures may be knocked down and reassembled for ease in transportation, fixture cost is reduced, fixture construction time is reduced, and it is simpler for subcontractors to set up their tooling. And, as Adolf Kastelowitz, Republic's chief of manufacturing research and development, points out, a light beam doesn't bend, dent, rust, expand, wear, sag or have weight, which makes it an ideal tool for making measurements.

Constant Torque Spring Motor

Runs Longer

A NEW spring motor developed by the Hunter Spring Co., Lansdale, Pa., reverses the accepted principles of power spring design to provide a constant output torque and longer running time. The new motor does this by deflecting only a small section of the spring's length from its natural curvature at a time. In contrast, the entire length of a conventional power or spiral spring is always involved in generating that spring's torque.

The principle on which the new device is based is illustrated in Fig. 1. An actuating coil with a natural radius of curvature R_1 is mounted on a spindle of the same radius and forcibly wound onto a spindle of larger radius R_2. When the external restraining force is released, the spring will run from the larger to the smaller spindle. Increasing the radii of the spindles increases the torque at the output point. Maximum torque is achieved in minimum space by back-bending the coil from one spindle to the other. The fact that only a small segment of the spring is deflected at a time provides essentially the same degree of torque over the entire run, eliminating the need for speed governors required in some other types of spring motors. No friction develops between the coils, a cause of energy losses that frequently influences the design of conventional power springs.

The basic type of spring motor now being produced by Hunter Spring Co. has three major parts: the power spring itself and two spindles or spools. The shaft or gear train to be driven by the new motor may be attached to the unit's bushing. Frequently, a drum and cable mechanism is used. The cable-type of power transmission can be used for linear motion, recoiling, balancing and backlash elimination.

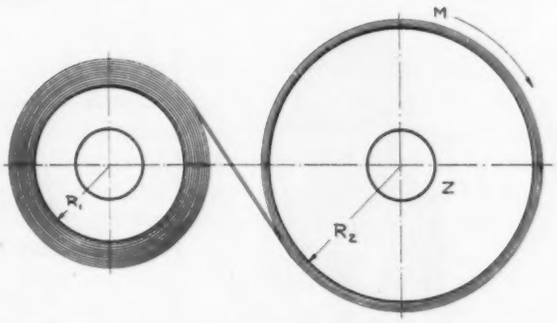


FIG. 1—Clockwise torque is exerted on spindle "Z" as the spring unwinds onto the smaller spool.

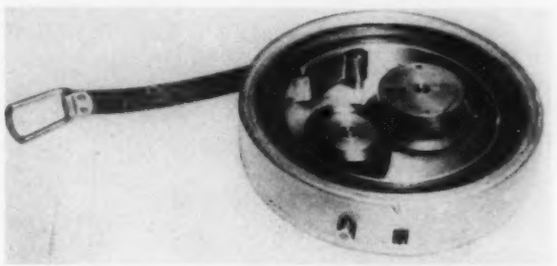


Fig. 2—A single spring motor retracts this 50-ft measuring tape. The spring is made from blue-tempered stock 0.005-in. thick, 3/8-in. wide and 250-in. long. Its indicated service life is 5000 cycles.

It is believed that the new spring motor will be particularly useful in products and equipment such as cameras, time recorders, mechanical recording instruments, automatic reels, anti-backlash mechanisms, balancing devices, and self-retracting steel tapes such as that shown in Fig. 2. For example, hand power tools on assembly lines could be spring-supported so that operators would not have to fight constantly against strong retracting forces.

Nickel-Chrome-Moly Steel Resists Graphitization

EXTENSIVE tests on valve castings have indicated that nickel-chromium-molybdenum steel is highly resistant to graphitization, according to a paper presented at the annual ASME meeting in New York last week. Tests made under service conditions in the field and laboratory studies of cast valves and fittings at steam temperatures up to 950°F were reported by T. N. Armstrong and R. J. Green, International Nickel Co. The cast steel valve, made available for study by Detroit Edison Co., was of approximate WC-4 composition, and had been in service for over 6 years. Resistance to graphitization was exceptionally high.

Metalworking Research Reaches All-Time High

STANFORD RESEARCH INSTITUTE
—Fourth of a Series—

by EMO D. PORRO
Head, Metals & Minerals Section
Stanford Research Institute
Stanford, Calif.

Metals and metallurgy are playing a growing role in the economy of the West. Just 2 years old, the Metals & Minerals Section of Stanford Research Institute has already launched 14 projects in metals and ceramics, most of them for relatively small companies.

METALLURGY plays an important role in the economy of the West. In the 11 Western States, 6.3 pct of the 1947 income earned came from the primary metals industry. Fabricated metals contributed an additional 6.6 pct. Since almost 13 pct of the economy of the West is based on metals, metallurgical research has been of interest to Stanford Research Institute ever since its founding late in 1946. Ceramics, with its contribution of an additional 3.3 pct to the 1947 earned income, is also a field that was of early interest to the institute.

The institute's Section of Metals & Minerals was inaugurated in October, 1948, when the first active metallurgical research project was started. In the 2 years of this section's existence, it has launched 14 projects ranging from process and physical metallurgy to clay studies and the theoretics of glass surfaces.

The section offers a highly diversified service. It is fortunate in being associated with the other departments of Stanford Research Institute. For example, chemists have helped in research problems touching on beneficiation of clays and on the mechanism of many typical chemical reactions involved in smelting, leaching, and electrodeposition.

In one very important aspect of metallurgical research conducted at the institute the Dept. of Business and Industrial Economics has played a major part. A survey of the economic feasibility of a potential new process or product before extensive laboratory or pilot plant investigations are undertaken has often proved invaluable. Development of processes or products in fields where economic conditions—markets, locations, transportation—are unfavorable are thus ruled out. Where economic conditions are favorable, the economic survey assists in making the objectives of the research investigation more specific and therefore aids in defining the scope and magnitude of the investigation.

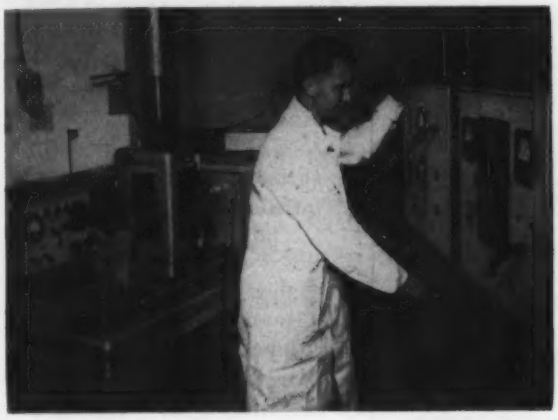
Many Specialists on Call

Specialists in electronics, geology, physics and other fields have all contributed to the numerous projects of the Metals & Minerals Section. The flexibility of the institute is shown by the accompanying box listing the fields of past and present projects.

Some of them obviously called for field work, but most were carried out in the institute's laboratories at Palo Alto, Calif. Certain of the facilities of Stanford University, with which the institute (a separate organization) is affili-

ated, have been made available for institute work. In addition, Stanford Research Institute's metal, glass and woodworking shops can fabricate special equipment.

Considering the limited number of projects worked on and their large variation in time and cost, the average cost of research projects is difficult to reach. However, a fair estimate for



EMISSION SPECTROGRAPH in the metallurgical laboratories of Stanford University which is available to SRI engineers. Behind the operator is the unit in which samples are exposed for spectral analysis by photographic means.

a 6-month project would be from $15,000 to $18,000. The average size of companies sponsoring projects is also difficult to estimate, but perhaps $2,000,000 to $3,000,000 income per year would be typical.

Shift to Physical Metallurgy

In the last year, the metallurgical research has been gradually shifting from work on process metallurgy to physical metallurgy. Larger projects have been in process metallurgy: Typical was the development of an alkali electrolysis process for the recovery of zinc from oxidized ores.

This project involved the preliminary evaluation of a process originally developed by the Bureau of Mines. The process was already at the pilot plant stage when the institute undertook active participation in its evaluation and improvement.

Essentially, it consisted of a leaching step in which the oxidized ore containing principally zinc carbonate and zinc silicate was treated with a concentrated sodium hydroxide solution. The zinc was leached out of the ore by the formation of sodium zincate, which is soluble in the sodium hydroxide. The resulting sodium hydroxide solution containing the desired concentration of zinc was first purified to eliminate the lead which was also present in the ore and became soluble during the leaching operation.

The zinc was recovered from the purified alkali solution by electrolytic deposition upon insoluble anodes. It was then recovered in a flake or powder form.

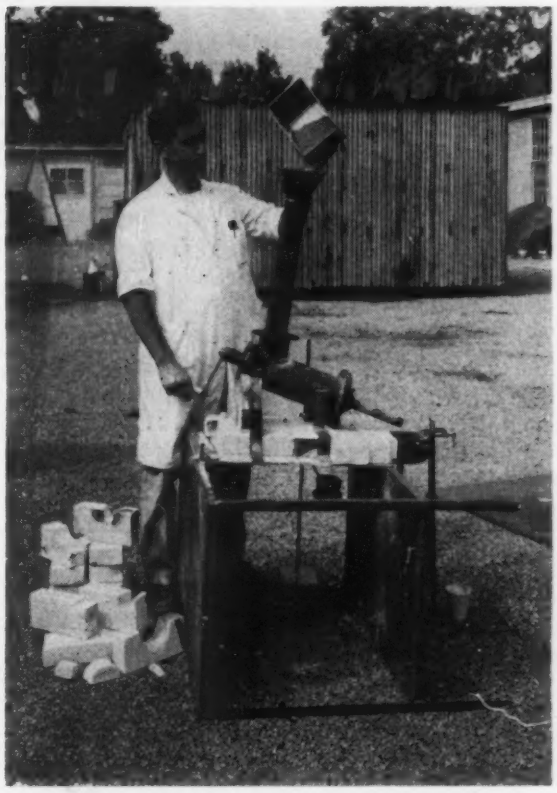
The institute's prime objective was to evaluate technically the entire process, chemically and mechanically, with reference to its commercial feasibility. This received an extensive investigation, both in the laboratory and in the pilot plant.

The second objective was to find the most economical way to convert the zinc flakes obtained from the electrolytic cell to commercial zinc slab.

Decision Based on Market Analysis

The third objective, after all necessary process and engineering data were obtained, was to determine the economic feasibility of the process in the light of raw material cost and supply, process cost, marketing costs, and so forth.

The three objectives were fulfilled and the final conclusion was that the installation of the process on a commercial scale in the location



EXPERIMENTAL UNIT for melting zinc powder. Efficient melting of powder is a major problem of the zinc smelting industry. This unit combines high temperature and pressure for efficient recovery of metallic zinc from powder.

in which it was intended would only be economical if the market price of zinc remained above a certain determined price for the next decade. This necessarily assumed that the ore cost would remain constant during that period. At that time, the institute's Dept. of Business and Industrial Economics had forecast that the

Continued

price of zinc would stabilize at a lower price range for the next decade. In the light of these conclusions, the research was suspended.

A typical small project (these have been principally in ceramics) was one in which a sponsor desired to know the cause of numerous failures in a ceramic body while being fired. Thin sections of the body before and after firing were made and examined by the petrographic microscope. The mineralogical changes taking place during firing, which were predominantly phase changes of the principal mineral component, were noted. From these data, recommendations were made to the sponsor which allowed him to substantially eliminate failures in the production of the ceramic body.

Sponsored research in 1950 in these fields at SRI was about eight times that under sponsorship in 1948, a healthy record of continued expansion of research in the metallurgical and ceramic fields. The industrial growth of the West will continue and Stanford Research Institute will attempt to expand appropriately to supply the necessary applied research to sustain this growth.

The West is still a principal source of ores for primary metal production. Therefore, the institute will maintain a strong interest and participate in process metallurgy to develop new and improve existing processes including ore beneficiation, smelting, ore leaching, and metal recovery by electrowinning.

On the whole, the fabrication of metals in the West is done by numerous but small companies. Physical metallurgy research is needed by these companies, but their size, along with many years of producing the same few products, makes it difficult for them to finance and to realize the need for applied research in the metal fabrication field. This situation is gradually changing with the industrial growth of the West and it is expected that the volume of physical research at the institute may soon equal and eventually surpass research in process metallurgy.

The ceramic field in the West offers an interesting challenge as many of the raw materials used are shipped in from Eastern sources. The extraction of alumina from high aluminum western clays for the aluminum industry and the economic beneficiation of western kaolin and fire clay deposits for use in high grade ceramic and refractory products are two major problems.

Many producers of ceramic products are small and need diversification, better manufacturing techniques and more uniform raw material to increase their income and decrease their production costs.

The present war emergency is spurring Stanford Research Institute and its Metals & Minerals Section on to widening its services and consolidating its advances in technology to meet present and anticipated demands upon its region. Western metals are becoming more important each year.

TYPICAL RESEARCH PROJECTS

METALLIC
- Geological & mining surveys of ore bodies
- Ore beneficiation
- Ore smelting
- Ore leaching
- Electrowinning
- Electrothermics
- Metal refining
- Physical properties of molten metals and alloys
- Corrosion of metal powders and metal powder products
- Physical, electrical and magnetic characteristics of metal powders
- High temperature metal corrosion
- Battery grade manganese dioxide
- Chromate chemicals on the West Coast

NONMETALLICS
- Clay beneficiation
- Drilling mud studies
- Research on properties of the complete bentonite series
- Composition and strengths of ceramic bodies
- Abrasives — zircon
- Surface properties of glass
- Foundry sands
- High temperature refractories
- Improvement of tile bodies
- Perlite

New Books

"Lexique Technique Anglais-Francais" (English-French Technical Dictionary), by Guy Malgorn. This third edition deals particularly with technical and shop terms. Although designed to help French readers in their understanding of American publications, it should prove helpful in the exact translation of English papers into French. Gauthier-Villars, 55 Quai des Grands-Augustins, Paris (6e. 1300 fr plus 110 fr postage. 332 p.

"Wage and Salary Fundamentals and Procedures," by L. B. Michael. Intent of the book is to provide a simple and practical means of obtaining a general understanding and appreciation of this entire subject; to identify and define each of its component parts; and assign to each its proper relationship, sequence and importance with regard to the whole subject. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. $4.50. 330 p.

Sigma Phase in Stainless

WHAT WHEN AND WHY

Part II

By George V. Smith
Research Metallurgist,
U. S Steel Research Laboratory
Kearny, N. J.

The effect of sigma on mechanical properties is particularly important in applications involving long exposure to high temperatures. In these cases, properties of the metal change continuously. Sigma can be converted into harmless delta ferrite by heat treatment; however, this restoration method may produce grain growth.

FROM the practical viewpoint interest centers on the effects of sigma on the material properties. Most early studies dealt with the occurrence and identification of sigma, but recent investigations have attempted to include the effects on properties. Whereas the effects of sigma are of some interest in all applications, they are especially so in those involving long time exposure to elevated temperature. In such applications, wherein sigma precipitates with time, the properties of the metal are not fixed as in applications at lower temperature, but instead change continuously.

Effect on Mechanical Properties

For purposes of discussion, it is convenient to group these effects into two main categories: mechanical properties and corrosion resistance. Other properties are doubtless also affected, but these have received little attention. Of course, when sigma forms from ferrite, there is a loss of ferromagnetism. The formation of sigma has also been reported to decrease electrical resistivity but to have a negligible effect on specific volume.

Whereas much is yet to be learned about the effects of sigma on the material properties and on serviceability of stainless steels susceptible to formation of sigma, it should be emphasized that these steels have been, and are being, successfully used in many commercial applications in the temperature range in which sigma may form.

The hardness of sigma at room temperature, measured by micro methods, has been reported to be in the range of about 600 to 750 DPH. Since it is hard, it may be anticipated that sigma will tend to increase the hardness or strength and reduce the ductility and toughness of steel in which it is present. Whether such effects are actually observed, and their magnitude if they do occur, depends, however, on the quantity of the phase and its distribution, especially the latter. Thus, the same quantity of sigma may be distributed in one sample in such a way that it alters the mechanical properties little if any, whereas in another sample, a different distribution may radically alter these same properties. Such differences have led some to suggest fallaciously that there is more than one kind of sigma. It should also be borne in mind that other microstructural changes, such as carbide precipitation, may also occur at the same time that sigma develops. The occurrence of these other changes makes it difficult to evaluate the specific role of sigma.

Sigma Occurs In Many Alloys

The effect of sigma depends on whether the alloy base is completely ferritic, duplex ferritic-austenitic, or completely austenitic. Although most of the reported data appear to relate to the latter two, some information is available for the ferritic alloys, wherein it may be recalled sigma may occur in alloys containing as little as 17 pct chromium. As perhaps an extreme example of the effect of sigma, Oliver[8] has cited the case of sheets of low carbon 27 pct Cr steel which, after being held 500 hr at 1350°F, broke like glass when dropped a few feet to the floor.

Sigma has been intimated by some investiga-

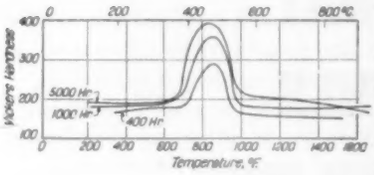


FIG. 7 — Effect of time and temperature of prior heating on hardness of 27 pct chromium steel at 70°F. Newell[9]. The strengthening at 885°F is attributed by some to precipitation of sigma.

tors to be the agent responsible for the so-called 885°F embrittlement observed in straight chromium steels, but the evidence is still controversial. Fig. 7 illustrates the change in hardness that occurs in 27 pct Cr steel in this temperature range. Associated with the hardening is also a marked loss in toughness; in fact, the effect on toughness is so marked that embrittlement may be developed simply by slow cooling through the 885°F temperature range. Embrittlement attributable to sigma or to 885°F brittleness, if this is different, or to both is an important factor limiting the use of 27 pct Cr-Fe alloy in certain industrial applications. This embrittlement has also limited the use of 17 pct Cr steel (type 430) for critical applications in the temperature range 800° to 1000°F. (See ASME Boiler Code Case 896.)

Stabilizers Increase Sigma

The occurrence of sigma, and the effects it may cause, in chromium-nickel-molybdenum steels containing titanium or columbium and having a duplex ferrite-austenite microstructure have been studied.[6, 10] These alloys have the nominal composition of 18-8-3-1 and may contain up to some 40 pct ferrite, which under appropriate treatment changes to sigma. The investigators made extensive microscopic, X-ray diffraction and magnetic measurements, and also mechanical and corrosion tests. On reheating metal which had been previously water-quenched from 1050°C (1920°F), a loss in magnetic permeability and an increase in hardness, Fig. 8, attributable to the precipitation of sigma was observed. The hardness peak at 500°C (930°F) was attributed to a precipitation of titanium carbide. The effect of reheating on bend ductility is shown in Fig. 9. In either case, maximum development of sigma occurs in the range 800° to 850°C (1470° to 1560°F).

The formation of sigma had no significant effect on tensile strength although it slightly decreased elongation and reduction in area. However, a very marked loss of notch-impact strength was observed. Fig. 10. Maximum sigma formation occurred in the range 750° to 900°C (1380° to 1650°F).

Cast austenitic steels often have a duplex structure of delta ferrite in austenite and the delta ferrite readily transforms to sigma, which may be harmful. Extensive transformation to sigma during slow cooling, necessarily employed in the production of large-section castings, may result in cracking. Although it is difficult to isolate the effects of sigma from other changes, the ductility of such partly ferritic steels after heating in the range wherein delta ferrite may change to sigma was observed by Gow and Harder[16] to be less than that of fully austenitic steels, and further that the fully austenitic steels showed much better strength in short-time tension and creep tests at elevated

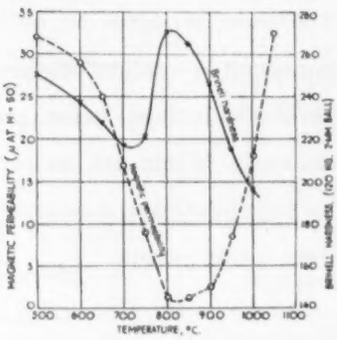


FIG. 8 — Effect of reheating 18Cr-8Ni-3Mo-0.7Ti steel on hardness and magnetic permeability at 70°F. Samples (previously water-quenched from 1920°F) were heated for 1 hr and water-quenched.[6]

temperatures than partly ferritic alloys. Although sigma is not always detrimental, its presence in castings is generally avoided wherever possible. This is especially true in applications at elevated temperatures, wherein embrittlement and inferior creep properties are associated with the precipitation of sigma.

Malcolm and Low[11] have reported on the embrittling effect of sigma in six alloys used for cast valves and fittings. Three alloys of the 18Cr-8Ni type, one plain, one with molybdenum and one with columbium, and three alloys of the 16Cr-35Ni type, one with molybdenum, one with vanadium and one with tungsten were exposed for up to 500 hr in the range from 1000° to 1500°F, and studied in Charpy keyhole notch impact tests at room and elevated temperatures. Prior to exposure the materials were annealed; in this condition the 18-8 type steels exhibited from about 3 to 11 pct delta ferrite, whereas the 16-35 steels had none of this phase. The results of the room temperature tests are summarized in Figs. 11 and 12. In all cases a deterioration in toughness occurred in the range above about 1000°F. Whereas sigma was identified by X-ray diffraction in the 18Cr-8Ni type alloys, and is therefore at least partly responsible for the observed decrease in toughness, this phase could not be identified in the 16Cr-35Ni type alloys. The loss of toughness in these latter steels, however, was similar to that in the 18Cr-8Ni type alloys, suggestive that some other change, perhaps carbide precipitation, is the principal of-

fender in both types of alloys, at least in these tests. The results of notch impact tests at 70°F compared with similar tests at elevated temperature in Table I show that, with a few exceptions at 1200°F, the toughness is greater at elevated than at room temperature. In particular, none of the elevated temperature tests fell below 20 ft-lb.

When weld metal of either 18Cr-8Ni-Mo (type 316) or 13Cr-8Ni-Cb (type 347) steel contains delta ferrite, tensile ductility and angle of bend, both measured at room temperature, are adversely affected by transformation of the ferrite to sigma in the range of about 1300° to 1600°F.[17] In the case of type 316, at least, no such loss was observed under similar heat treatment when the weld metal was fully austenitic. A similarly adverse effect of sigma forming from ferrite in weld metal of 18Cr-8Ni-Cb has been reported.[12]

On the other hand at least one type of alloy, containing about 25 Cr, 5 Ni and 3 Mo (nonstandard AISI type 329), is purposely heat treated to develop the sigma phase. This alloy, which as hot rolled has a hardness of about 31 Rc, hardens to about 43 Rc on heating 15 hr at 1400°F. The hardness of this steel is claimed to make the alloy resistant to wear in automotive valve applications.

In completely austenitic steels the combined

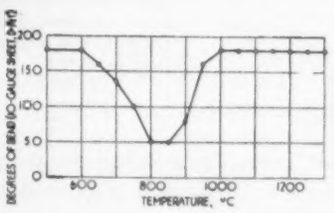


FIG. 9 — Effect of reheating 18Cr-8Ni-3Mo-0.7Ti steel on ductility of bend tests to fracture at 70°F. See Fig. 8 for treatment.[6]

effects of sigma and carbide precipitation are observed most prominently in the ductility of a tension or bend test and in the notch impact strength, especially the latter. The effect of these structural changes on hardness, yield and tensile strengths is less marked, although they may be of appreciable magnitude. Data summarized in Table II illustrate that both carbide and sigma precipitation cause changes in properties. For these hardness, tensile and impact tests, samples were used which had been tested in creep, undergoing therein not more than 1 or 2 pct strain. Although the plain 18Cr-8Ni steel developed no sigma, its properties were altered, presumably as a consequence of carbide precipitation; the most pronounced change was the loss of notch impact strength; however, the metal still possessed a considerable degree of ductility and toughness. The property changes were more pronounced in the 18 Cr-8 Ni-Mo steel in which up to some 5 pct sigma precipitated, in addition to carbide, and the greatest loss in notch impact strength, from 55 to 6.5 ft-lb, is worth noting.

Fig. 13 illustrates the effect of time and temperature of exposure on the notch impact strength of 25 Cr-20 Ni steel. The pronounced loss in toughness that may occur is attributable in part to carbide precipitation but largely to the precipitation of sigma, which formed in a relatively large amount (in excess of 8 pct). No consistent trends in yield or tensile strength with increasing sigma were noted, but the elongation and reduction of area both decreased to a minimum for exposure between 1400° and 1600°F. Additional notch-impact tests at 1200° and 1400°F showed less loss in toughness than at room temperature. Tests of material which after precipitation of sigma was heated above the range of sigma precipitation, i.e., reannealed, showed substantial recovery of toughness.

Sigma Weakens Hi-Temperature Strength

The effect of sigma upon strength at elevated temperatures has been the subject of some speculation, but little investigational effort. In studying the effect of grain size[13] on strength of 18Cr-8Ni, 18Cr-8Ni-Cb, 25Cr-12Ni and 25Cr-20Ni steels at elevated temperature, precipitation of an unknown phase, subsequently identified as sigma, was observed in the fine-grained samples of all steels except plain 18Cr-8Ni. Since the steels varied simultaneously in grain size and presence of sigma it is not possible to decipher directly the specific role of either factor. However, a reasoned analysis of the data suggests that sigma is detrimental on the basis that grain size difference in the plain 18Cr-8Ni steel, without sigma, brought about only slight differences in creep or rupture strength, where-

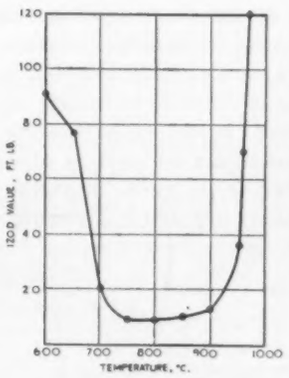


FIG. 10 — Effect of reheating 18Cr-8Ni-3Mo-0.3Ti steel on notch impact strength. Samples (previously water-quenched from 2100°F) were heated for 4 hr and air-cooled.[39]

as in the other steels which differed in both grain size and sigma, those containing sigma were significantly weaker. Fig. 14 shows these results for the stress to cause rupture in 10,000 hr. It was observed, however, that the fine-grained steels had superior ductility.

Study of the effect of sigma on the elevated temperature tensile and creep properties of 25Cr-20Ni-2Si steel on samples having the same grain size but different amounts and distribu-

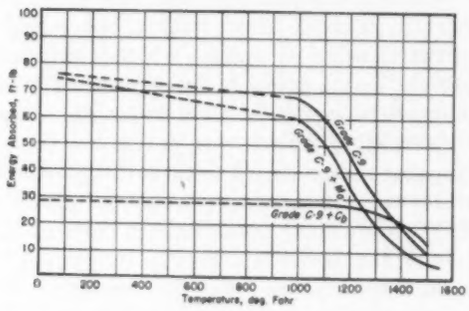


FIG. 11—Impact strength of 18Cr-8Ni type steels measured at 70°F with Charpy keyhole notch after 500 hr exposure.[11] Grade C-9, 18Cr-8Ni; Grade C-9 + Mo, 18Cr-8Ni-Mo; Grade C-9 + Cb, 18Cr-8Ni-Cb.

tions of sigma, has shown that whereas sigma increases tensile or yield strength and also creep strength for relatively fast strain rates, creep strength for slow strain rates, characteristic of most long-time applications, is lowered.[14] The sigma-containing samples were prepared by various pretreatments and compared with the same material not having these prior treatments. Thus, the exact analysis of the role of sigma was complicated by the fact that sigma was tending to form during test in the samples not previously containing sigma. Like others, these investigators also observed that sigma causes loss of toughness at room temperature.

Effect of Sigma on Corrosion

The corrosion of stainless steels may occur in a number of ways. The attack may be general, intergranular, pitting, or, when under residual or applied stress, transgranular (stress-corrosion cracking). Because it manifests itself in different forms and is affected by a number of factors, it is difficult to isolate the specific effects of sigma. In all cases the size and distribution of the sigma as well as other phases may be expected to be quite important and also whether the alloy is ferritic, austenitic or duplex in nature.

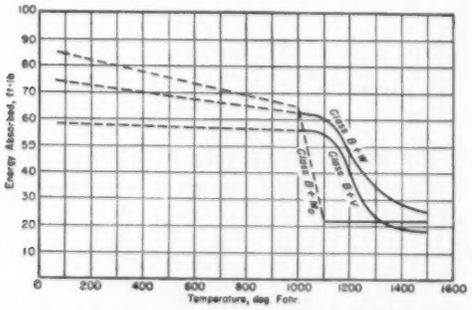


FIG. 12—Impact strength of 16Cr-35Ni type steels measured at 70°F with Charpy keyhole notch after 500 hr exposure at indicated temperature.[13] Class B+W, 16Cr-35Ni-W; Class B+V, 16Cr-35Ni-V; Class B+Mo, 16Cr-35Ni-Mo.

Few data have been reported on the role of sigma in the corrosion of the ferritic type alloys. Results for 27 pct Cr steel in several conditions of heat treatment under attack by boiling 65 pct nitric acid[9] are shown in the box. It will be observed that both the precipitation of sigma and the structural change associated with 885°F embrittlement result in reduced corrosion resistance in this medium.

The influence of sigma on the corrosion resistance of 18Cr-8Ni-3Mo-0.3Ti steel, which in the annealed condition is duplex austenitic (60 pct)—ferritic (40 pct), was investigated, with results shown in Fig. 15 for the tests in 25 pct sulfuric acid at 40°C (104°F). As in the case of the results in Fig. 10, samples previously water-quenched from 2100°F, were reheated at the indicated temperatures for 4 hr and air-cooled. Maximum weight loss was observed after heating at 750°C; the loss of corrosion resistance was attributed to the presence of sigma. Additional tests of similar samples in 5 pct sulfuric acid either at room temperature or at 40°C (104°F) showed only slight weight losses and without relation to heat treatment

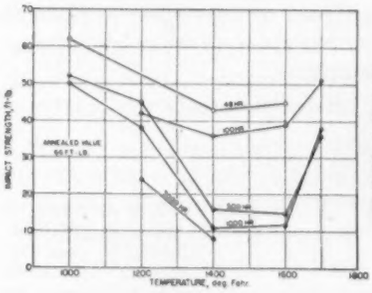


FIG. 13 — Effect of time and temperature of heating on impact strength of 25Cr-20Ni steel measured at room temperature with Charpy keyhole notch.[7]

temperature. Other tests of selected samples exposed under service conditions to a saturated solution of ammonium sulfate containing a small percentage of acid and boiling under reduced pressure gave negligible weight loss in all instances.

Sigma Increases Corrosion Rate

The fully austenitic stainless steels, unless stabilized by additions of titanium or columbium, are subject to an insidious intergranular corrosive attack attributed by many to chromium depletion adjoining intergranularly precipitated carbides. Since this intergranular sensitization by carbide precipitation occurs within the same temperature range in which sigma precipitates, it is difficult to decipher the exact role of sigma. From an exhaustive study of the effects of molybdenum and columbium on austenitic stainless steels,[15] it was concluded that the precipitation of sigma, as well as of carbide, reduces corrosion resistance. Whereas it is not difficult to imagine sigma playing a role similar to carbide, inasmuch as similar impoverishment of chromium must occur, the actual evidence does not appear to be incontrovertible. The conclusion that sigma is detrimental in fully austenitic alloys may be based on com-

TABLE I

Notch Toughness

Effect of Exposure on Notch Toughness of 18Cr-8Ni and 16Cr-35Ni Type Steels[11]

Charpy Keyhole Notch Impact Strength in Foot-Pounds
(Average of three tests)

Grade	Tests at 70° F				Tests at Indicated Temperature		
	As Annealed	After 500 hrs. Exposure At			After 500 hrs. Exposure At Same Temperature		
		1200° F	1350° F	1500° F	1200° F	1350° F	1500° F
18-8	76.0	46.0	25.0	13.0	27.0	26.0	21.5
18-8-Mo	74.0	34.0	16.0	6.0	31.0	30.0	26.5
18-8-Cb	28.0	27.0	23.0	13.0	32.0	32.0	28.3
16-35-Mo	85.0	22.0	22.0	22.0	33.0	34.0	30.0
16-35-V	58.0	40.0	20.0	18.0	37.0	36.0	33.0
16-35-W	74.0	47.0	31.0	26.0	41.5	40.0	36.0

parison of fully austenitic material with material containing some delta ferrite which transformed to sigma.

Additional evidence that sigma may in some instances adversely affect the corrosion resistance of austenitic steels has been adduced from the fact that the newly developed ultra low-carbon stainless steels, having scarcely more carbon than the solubility limit in austenite, have not proven immune to intergranular sensitization in all cases. The intergranular susceptibility in these instances has been widely attributed to sigma, but apparently only Binder and Brown have offered any direct experimental evidence. These investigators found that a steel containing 0.006 pct C, 0.014 pct N, 18.6 pct Cr, 19.1 pct Ni and 2.9 pct Mo was rendered susceptible to intergranular attack in boiling 65 pct nitric acid by heating only 10 min at 1380°F. Other ultra low-carbon steels not containing molybdenum remained immune under such treatment. Metallographic examination showed a grain-boundary phase, which was concentrated by electrolytic dissolution of the matrix and identified as sigma. This phase was observed in a sample held for the surprisingly short time of 10 min at 1380°F.

If intergranular sensitization of molybdenum-containing austenitic stainless steels may result from precipitation of sigma, it is worth while to note that, unlike the sensitivity resulting from carbide precipitation, it is observed only in boiling nitric acid and not in the several other test media which have been used. It is further of interest to point out that prolonged heating in the sensitization range restored the resistance to intergranular attack even in nitric acid. In other words, sigma is apparently only detrimental under very specific

Heat Treatment	Inches Penetration Per Month
Annealed	0.000744
Embrittled 500 hr at 885°F	0.002580
Embrittled 6000 hr at 885°F	0.009090
Sigma precipitated in 2900 hr service	0.002080

TABLE II

Effect of Exposure During Creep

Tests on Room Temperature Tensile Properties and Notch Impact Strength of 18Cr-8Ni (304) and 18Cr-8Ni-Mo (316) Steels*

(Creep Tests of 3000 hours duration except as noted)

Steel	Creep Test. Temperature	Pct Sigma	DPH Hardness	0.2 pct Offset Yield Strength, 1000 psi	Tensile Strength, 1000 psi	Elongation, Pct in 2 in.	Reduction of Area, Pct	Charpy Keyhole Notch Impact 2/3 Size Specimen ft. lbs.
18-8	None	0	142	34.2	86.9	65.5	78.5	54.0
18-8	1100	0	150	38.3	86.9	56.0	71.0	42.0
18-8	1300	0	137	28.3	80.0	59.0	65.0	30.5
18-8	1500	0	134	28.2	81.3	63.0	70.0	27.6
18-8-Mo	None	0	145	36.5	85.6	60.5	78.0	55.5
18-8-Mo	1100	†	173	49.5	92.2	46.0	64.0	29.0
18-8-Mo	1300	3	190	41.8‡	99.0‡	36.0‡	47.0‡	10.5
18-8-Mo	1500	5	168	39.9	92.7	36.0	44.0	6.5

Smith, Dulis and Houston[3]

* Steels initially water quenched from 1900° F (304) and 2000° F (316), which developed grain sizes of 3 to 5 and 4 to 6 respectively.
† Pct Sigma uncertain but less than at 1300° F.
‡ Test of 2000 hours duration.

conditions, a very fine intergranular dispersion when subjected to boiling nitric acid.

If in any case the occurrence of sigma is harmful it is important to realize that sigma may be dissolved in austenite or converted into delta ferrite by heating above the maximum temperature of stability of sigma. By such treatment the original properties may be substantially or wholly restored. Considerable ductility can be restored to steels embrittled by sigma, by heating for as short a time as 10 min at 1900°F, although complete conversion of sigma to austenite may require heating at a temperature as high as 2250°F. If such high temperatures are required, grain growth may be anticipated with associated alteration of properties.

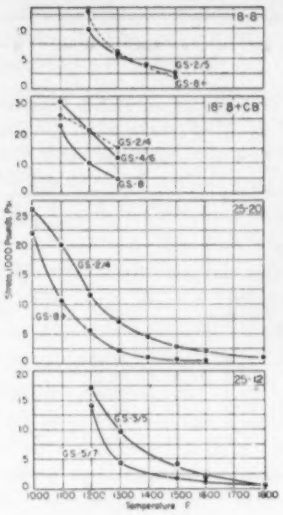


FIG. 14 — Effect of grain-size and sigma on the stress required to produce rupture in 10,000 hr. Fine-grained samples of all steels except 18-8 showed sigma phase.[12]

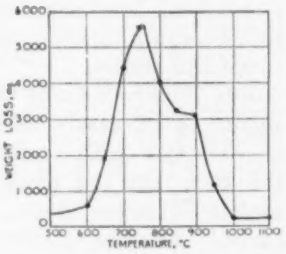


FIG. 15 — Effect of reheating 18Cr-8Ni-3Mo-0.3Ti steel on corrosion in 25 pct sulfuric acid at 40°C (104°F). Samples (previously water-quenched from 2100°F) were heated 4 hr and air-cooled.[10]

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Microthrowing Power Studied

IN an earlier study of plated metal-powder compacts, it was found that the deposits extended into surface and subsurface voids, sometimes into labyrinths several thousandths of an inch deep. There appeared to be marked differences in the extent to which this occurred with different plating solutions. A paper presented by C. E. Reinhard at the Boston meeting of the AES described an attempt to establish the factors controlling microthrowing power. This was done by means of systematic variations of plating conditions in several nickel solutions.

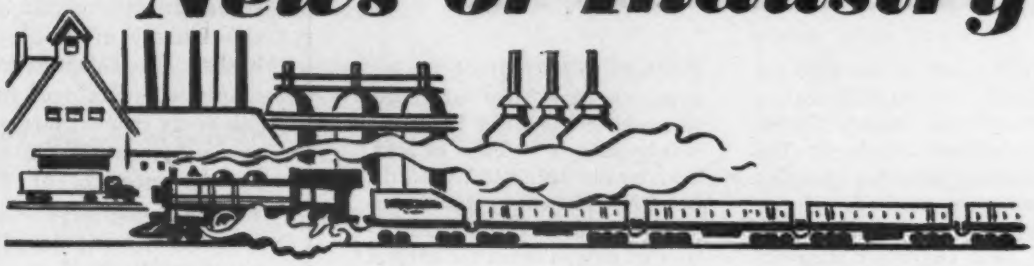
Specimens with specially prepared grooves of a size corresponding to some of the surface voids in compacts were used. A complete explanation has not been derived, but the effects of several variables were noted. The microthrowing power of cyanide copper solutions is poor, while that of bright nickel is good. The problem was studied to discover, if possible, the reason for these phenomena, especially with application to plating on powdered metal parts which are inherently porous. Three nickel solutions were set up: (1) dull; (2) dull, but without the ammonium salt constituent; and (3) bright.

The type of basis metal had little effect. The affect of anode to cathode spacing was also slight. Groove depth had a little more effect, tending to reduce microthrowing power with more depth. Coating thickness of dull nickel had no effect, while with bright nickel it had little effect. A comparison of cyanide copper and acid copper showed that the acid copper had decidedly better microthrowing power.

Metal content and current density had the greatest effect of any of the variables; increased metal content tended to increase the microthrowing power, while increased current density acted in the opposite direction, to decrease microthrowing power. Increase in temperature acted to increase the microthrowing power.

One of the causes which seemed to be indicated was that microthrowing power seemed to depend upon the number of metal ions available at the surface, more than any other single factor. Some work has been done on spotting out, but no conclusions have been reached as yet.

News of Industry



Average Increases Per Ton

Product	Increase per ton
Forging billets, blooms & slabs	$3.00
Rerolling billets, blooms & slabs	3.00
Skelp	4.00
HR bars	5.00
Structural shapes	5.00
Plates	4.00
Rails	4.00
CR sheets	5.00
HR sheets	5.00
Galvanized sheets	8.00
Electrical sheets	11.00
HR strip	5.00
Concrete bars	5.00
Pipe & tube	$7.00 to 13.00
Wire	7.00
Wire rods	5.00

Chicago Firms' Expansion Plans

Chicago — Plans for investing $5,137,500 in new factory facilities, land, or buildings were announced by Chicago firms during November, according to Leverett Lyon of the Chicago Assn. of Commerce and Industry. The figure fell 80 pct below figures announced for October, Lyon said.

Use Electric Annealing Furnaces

Schenectady—Savings in manufacture of malleable castings for railroad and automotive industries through use of electric annealing furnaces at National Malleable & Steel Casting Co., Cleveland, is claimed by General Electric Co. The five furnaces have a combined load capacity of 25 tons.

Steel Prices Up 5½ Pct, Wages Up 16c

Wage-price action by U. S. Steel sets pattern for the industry . . . Higher wages and prices effective Dec. 1 . . . Average weighted increase per ton close to $5.88.

Pittsburgh—The steel industry is quickly falling in line with the pattern-setting agreement between U. S. Steel Corp. and the United Steelworkers of America (CIO) calling for an average wage increase of 16¢ per hr.

Climaxing 6 weeks of intermittent negotiations here, U. S. Steel and the union signed an agreement last Thursday calling for a wage increase for 155,000 employes in six of the company's operating subsidiaries, effective Dec. 1. The agreement will add $125 million or 11 pct to the company's annual wage costs; it will raise steelmaking costs an average of 5½ pct.

Average About $5.88 a Ton

At the same time, U. S. Steel subsidiaries raised steel prices, effective Dec. 1, an average of 5½ pct. Increases on individual products vary from $3 to $13 a ton. Other major steel producers indicated they would match the new prices, although some smaller companies are still expected to charge more. The weighted average increase is $5.88 a ton.

This is the first price increase on most steel items since December, 1949, when prices were raised approximately $4 a ton to cover the cost of pensions and inurance.

In announcing the increases, Ben Fairless, U. S. Steel president, said that they reflected only higher employment costs resulting from the labor settlement. They do not reflect accumulated increases in material costs which now amount to more than $4 a ton of steel. Nor do they allow for expected additional material cost increases.

Base Wage Boost 12½¢

The wage increase was in the form of an amendment to the existing contract, which will expire in total Dec. 31, 1951. Under this contract, only wages were negotiable.

The agreement provides for a general wage increase of 12½¢ per hr for workers in the company's northern operations, plus an increase of ½ cent in the differential between 32 job classifications. This increase in the differential, from 4½¢ to 5¢, averages out to 3½¢ for a total of 16¢. Employees of Tennessee Coal, Iron and Railroad received a general increase of 17¢, plus the same ½¢ increase in the differential between job classifications, or an average of 20½¢ per hr. This was another step in the union's long campaign to eliminate the geographical differential between the North and the South. Before the new agreement this differential was 14½¢; it is now 10¢.

The ½¢ increase in the job clas-

INDUSTRIAL SHORTS

LIGNITE LAB—A new $750,000 BUREAU OF MINES lignite laboratory at Grand Forks, N. D., is now completed. The new building provides facilities for studying methods of increasing the use of lignite for power, heat and other purposes for further development of the Great Plains and nearby states.

REORGANIZED — Ingersoll Steel Div. of the BORG-WARNER CORP. has been reorganized into two independent manufacturing units. One unit with plants in Chicago and Kalamazoo, Mich., will be operated as the Ingersoll Products Div. with Robert S. Ingersoll as president and general manager. The present name will be retained by the other unit which has steel mills at New Castle, Ind., with Harold G. Ingersoll as president and general manager.

GROWING—A new manufacturing plant at Union, N. J., is being constructed by AIR REDUCTION CO., INC. This new facility will be used by the Airco Equipment Mfg. Div.

CONSOLIDATING—A 100,000 sq ft building in Chicago's Addison-Kimball district is being constructed by J. Emil Anderson & Son, Inc., and will be leased to AMERICAN CYANAMID CO. The Cyanamid firm occupies several office and warehouse locations in Chicago which will be consolidated in this new building.

NEW PLANT—A new bronze and brass smelting plant costing $750,000 is being constructed by BENJAMIN HARRIS & CO. in Chicago Heights. Scheduled for operation in March, 1951, the plant replaces the property destroyed by fire earlier this year.

MOVING—The general offices of the Baroid Sales Div. of NATIONAL LEAD CO. will be moved in 1951 from the Los Angeles headquarters to Houston.

PAPERS WANTED—A symposium on the "Use of Spectroscopy in the Steel Industry" will be held in Chicago in May, 1951, by the AMERICAN ASSN. OF SPECTROGRAPHERS. Papers from members on nonmembers on any phase of the subject are invited and should be sent to Ralph H. Steinberg, 9531 Avalon Ave., Chicago.

COMBINES OPERATIONS—The R-S Products Corp., Philadelphia, manufacturers of butterfly valves, has been purchased by the S. MORGAN SMITH CO., York, Pa., hydraulic turbine and valve manufacturers. There will be no change in the operations of the Philadelphia concern.

CHROME DIVISION—An Industrial Chrome Div. has been established by WARD LEONARD ELECTRIC CO., Mount Vernon, N. Y. The division will engage in the development and manufacture of chrome plating units, solutions and processes for industrial hard chrome plating of machine tool accessories and component parts.

OPENS IN DETROIT—A Michigan Sales Div. at 10526 Grand River Ave., Detroit, has been opened by the CLEVELAND INDUSTRIAL TOOL CO., Cleveland. C. A. Hubley was appointed manager and Ken C. Boalen, field engineer.

ASME OFFICERS—J. Calvin Brown, engineer and patent attorney of Los Angeles, has been elected president of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS. Regional vice-presidents are: Henry Reginald Kessler, Stephen Dewey Moxley, Dr. John T. Rettaliata, and Carl J. Eckhardt.

TOOL AGENT—The Taft-Peirce Mfg. Co., Woonsocket, R. I., has appointed the GOTTSMAN MACHINERY CO., Detroit, as its exclusive representative for machine tool sales in Detroit, Toledo and the eastern half of Michigan.

sification increments will work to the benefit of employees in the higher job classifications. For example, the employee in the lowest job class in northern plants is increased from $1.185 to $1.31 per hr—an increase of 12½¢. However, the employee in job classification 32 is increased from $2.58 per hour to $2.86, an increase of 28¢. For T. C. & I. employees, the increases range from 17¢ in the lowest job class to 32½¢.

In a resolution approving the settlement, the union's wage-policy committee instructed negotiating committees for other steel producers to resume collective bargaining conferences immediately. The union will ask for the general increase of 16¢ an hour and, "where appropriate," the additional 4½¢ toward elimination of area differentials.

Ore Workers Covered

Philip Murray, union president, told reporters the negotiators had discussed the so-called non-economic fringe issues but that these were dropped despite the union's offer to extend the agreement through 1952. These issues were not negotiable under the contract.

The outcome of the negotiations eventually will affect some 600,000 workers in basic steel and about 1 million in steel fabricating plants.

Approximately 20,000 ore field workers will receive a 12½¢ per hr increase, plus 8½¢ to be paid into a pool to be distributed when the producers and the union agree on job classifications for these workers. Ore field employees are not now classified on the basis of their jobs as are the steel workers. It is expected that perhaps 16 such classifications will be set up as compared with the 32 in steel. The ore field workers will realize a minimum of 3½¢ per hr in addition to the 12½¢ on the base.

The union met Tuesday with Aluminum Co. of America to ask for a reopening of negotiations with a view to signing a contract comparable to the steel settlement. Alcoa wages rose 10 pct.

Plan 300,000-Ton Taconite Pellet Pilot Plant

Reserve Mining Co. awaits pumping water permits to open construction . . . Production seen in year . . . Will produce 60 pct iron ore pellets or sinter, use open pit ore.

Cleveland—Plans for construction of a 300,000 annual ton pilot plant at Babbitt, Minn., for the production of taconite pellets were announced here by Reserve Mining Co., owned by Republic Steel Corp. and Armco Steel Corp.

Construction will start as soon as necessary permits are secured from Minnesota and the U. S. Government for pumping water required in processing the ore from a nearby lake.

Capacity 300,000 Tons

Operations in the pilot plant will be started in approximately a year. The plant will have an annual capacity of 300,000 tons of 60 pct iron ore pellets or sinter. Though it will be equipped to produce pellets primarily, provisions will be made for the production of sinter, if required.

The pilot plant will utilize, as far as possible, buildings erected by the Mesabi Iron Co. about 25 years ago. Crude ore for the plant will be produced by open pit methods similar to those used in quarrying rock.

The pilot plant will be located near the town of Babbitt, about a mile and a half from the pit, and and a new town will be developed about 2 miles north of Babbitt.

About $7,500,000 will be expended for opening the mine, for new equipment and for constructing the plant and the new town. Building of the pilot plant will be the first step in carrying out the $160,000,000 program announced recently by the company.

Large Scale Pilot Plant

The plant, which will be only a large scale pilot operation and not a full size commercial unit, is being built to test out certain phases of the process of beneficiating this iron-bearing taconite into high grade ore.

Plans are now in process for the construction of a commercial plant capable of producing about 2,500,000 tons of ore pellets annually at Beaver Bay on the North Shore of Lake Superior. The plant, together with a 47-mile railroad, loading facilities, a dock and harbor, will represent an investment of more than $60,000,000. While longer range development plans providing for future expansion of the plant, to provide an annual capacity of 10,000,000 tons, will represent an investment of an estimated additional $100,000,000.

Iron Ore Problem Critical

Cleveland—Iron ore supplies are a critical question mark in the light of Soviet aggression and although the U. S. has enough for the immediate future, cheap open pit Mesabi ore will not last too long under capacity production, said Tom C. Campbell, editor of THE IRON AGE, at a meeting of the Cleveland Chapter of the American Society for Metals held here.

He suggested prolonging the life of Mesabi supplies by supplemental new fields and taconite concentration. Mr. Campbell pointed out that the vast new fields in Canada and Venezuela will not produce for years and that a heavy load will be thrown on the Quebec-Labrador fields if enemy subs harry supply lines in event of World War III.

October Iron & Steel Production by Districts

As Reported to American Iron & Steel Institute

BLAST FURNACE CAPACITY AND PRODUCTION —NET TONS	Number of Companies	Annual Blast Furnace Capacity July 1, 1950	PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL			
									Pct of Capacity	
			Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date
Distributed by Districts:										
Eastern	12	13,353,580	1,151,794	10,440,963	23,668	266,931	1,175,462	10,707,894	103.6	96.3
Pitts.-Youngstn.	16	26,735,520	2,162,127	20,051,739	27,978	204,028	2,190,105	20,255,764	96.4	91.0
Cleve.-Detroit	6	7,044,600	581,959	5,681,156			581,959	5,681,156	97.2	96.8
Chicago	7	15,897,190	1,235,710	11,323,678			1,235,710	11,323,678	91.5	85.5
Southern	9	5,215,640	464,833	4,173,303	10,868	82,345	475,701	4,255,648	107.3	98.8
Western	4	3,375,200	265,490	2,180,157			265,490	2,180,157	92.6	78.2
Total	37	71,621,730	5,861,913	53,850,996	62,514	553,301	5,924,427	54,404,297	97.4	91.3

STEEL CAPACITY AND PRODUCTION —NET TONS	Number of Companies	Annual Steel Capacity July 1, 1950	PRODUCTION							
			TOTAL STEEL				Alloy Steel* (Incl. under total steel)		Carbon Ingots-Hot Topped (Incl. under total steel)	
					Pct of Capacity					
			Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date
Distribution by Districts:										
Eastern	24	20,387,480	1,895,123	15,514,010	97.9	92.7	126,731	1,058,381	317,722	2,829,586
Pitts.-Youngstn.	33	39,127,940	3,444,965	31,389,311	103.6	96.2	484,563	4,028,438	362,029	3,349,530
Cleve.-Detroit	8	9,333,480	811,958	7,697,925	102.4	99.0	52,666	463,537	100,268	1,010,019
Chicago	15	21,351,700	1,871,780	17,338,386	103.2	99.1	150,170	1,313,171	252,109	2,392,852
Southern	8	4,588,320	430,860	3,988,559	110.5	104.7	5,767	46,342	5,175	49,996
Western	11	5,774,620	485,409	4,433,467	98.9	92.9	9,370	80,373	8,229	82,917
Total	78	100,563,500	8,740,095	80,341,628	102.3	96.6	829,267	6,990,240	1,065,532	9,714,900

* For the purpose of this report, alloy steel includes stainless and any other steel containing one or more of the following elements in the designated amounts: Manganese in excess of 1.65%, and Silicon in excess of 0.60%, and Copper in excess of 0.60%. It also includes steel containing the following elements in any amount specified or known to have been added to obtain a desired alloying effect: Aluminum, Chromium, Cobalt, Columbium, Molybdenum, Nickel, Titanium, Tungsten, Vanadium, Zirconium, and other alloying elements.

Steel's Tubular Goods Output At Peak But Shortage Is Severer

Oil and gas drillers forced to rely on conversion and gray market.

Chicago—Although the steel industry is furnishing more tubular goods for oil and gas drilling in this country than ever before, oil and gas producers think the shortage now is greater than in 1948.

They are being forced to rely on conversion arrangements, gray market, tie-in sales, second hand pipe and imported German pipe. German pipe, not available in 1948, is being sold at substantial premiums over mill prices.

These facts were emphasized in a recent survey of oil and gas producers by the Independent Petroleum Assn., Washington, D. C., concerning the present state of steel supply in the industry.

Gray Market Buying

The survey showed that some producers had to pay a gray market price of $2.95 per ft for new 5½ in. OD 15.5 lb 8 round thread J-55 casing. Others reported that they expect to pay 100 pct above the market price for casing and tubing before the first of the year.

In another instance, a producer had 302 tons of pipe on order with suppliers. The orders were placed in the first quarter of this year and during April. However, nothing has been received as yet. As a result the producer had to buy 100 tons in the gray market, paying an average premium of $1.40 per ft on 5½ in. 14 lb and 50¢ per ft on 2 in. tubing. They also bought 150 tons of second hand pipe, paying a premium of $1.30 per ft. These conditions are representative of the replies received.

The report pointed out that although some drilling can be delayed until pipe is received from regular suppliers, many times a producer is forced to seek pipe through every possible means and at any cost to keep from losing his lease and investment.

GERMAN STEEL—A Weapon for the Allies

Raw materials supply bottlenecks suddenly welcome German steel output . . . German Steel Assn. says Sweden lowers ore supply . . . Foreign financing needed—*By Ted Metaxas.*

New York—Now that the Reds have shown more conclusively that the Iron Curtain is swiftly portable and may lower over Europe, Allied opinion has swung to revitalization of West German steel to erect a buffer before the Reds. A sounder German steel industry could export much-needed steel to feed the Atlantic Pact nations' rearmament project.

But German steel cannot grow unaided. Its plants have been decimated by bombings, its finances have been depleted—and now the problem of raw materials is causing a more serious bottleneck than repairs or the effects of dismantling.

The Allied High Commission may formally decide on a German production quota. It may inform Germany that she may have the privilege of exporting unlimited amounts of steel to Western defense. But in line with this program it must restore the industry's economic health and smooth over supply problems.

First Things First

In a letter to THE IRON AGE, the Assn. of Iron and Steel Industries, Dusseldorf, Germany, stated that present steel capacity under favorable conditions could be estimated at 14.5 million tons, but that this figure is dependent on the availability of coke, iron ore, limestone, gas and electric power.

Sweden has partially reduced iron ore supplies to Germany because the Germans could not keep up their end of the bargain with coal deliveries. While industry in Germany has hopped out of second gear, output of coal could not meet the strain. It flopped during the summer and the export tonnage—

JET ENGINE RINGS: Flash butt welding of titanium rings for aircraft jet engine components at the Warren, Ohio, plant of the American Welding & Mfg. Co. is on a production basis. Rings are sized after welding and machined to close tolerances.

decreed by the Ruhr Authority—was 600,000 tons short of the mark in the latest quarterly period.

Foreign Financing Needed

Foreign financing is needed to rehabilitate the steel industry if it will contribute more substantially to Western defense. Right now it could possibly meet the production quota of 14.5 million tons which the Allied High Commission's study group was on the verge of agreeing to in London last month. The French upset the applecart despite the Russian handwriting on the wall. Historic importers of German coking coal, the French want ample protection for their own steel industry by insuring coal exports. But can they get blood out of a turnip?

The Allies are champing at the bit to get more steel out of Germany and spokesmen for the industry have found the ripe time to climax demands for no-ceiling production. The Dusseldorf Steel Congress and the Bonn government have both been hammering away.

On Nov. 26, the Allies sanctioned West German production of 300,000 tons of steel for the last quarter of 1950. It must go to Western defense.

A defined portion of future expanded production would stay in the country and the rest would go to the West. The German steel industry also needs more of its own products to restore itself to prewar levels of 18 to 20 million ton production.

German Price Advance

German mill prices on finished steel will have to go up, said the Assn. of Iron and Steel Industries. Price advances in raw materials made this a necessity. The industry is now faced with rising wages. If they go up too high, German steel will be further burdened.

The industry had until the Korean war received little stimulus to grow. Feelers for steel came from the U. S. with the blast of post-Korea steel buying and the Germans shipped out all they could spare. They surpassed their annual output quota of 11.1 million tons by 100,000 tons. Not much was said in criticism.

The German AISI said that after Korea, orders for steel exceeded possible production by three times. In June, Germany sold 64,000 tons of rolled steel to the U. S. and in August, 150,190 tons—a significant increase.

If the Allies intend to make a weapon out of the German steel industry—let it be a good one. To France, Germany is always a potential enemy. To both England and France she is a tough competitor. On the other hand, Russia may mean extinction.

EASIER CUTTING: Cutting of slag-encrusted skulls, spills, and ladle buttons into heavy melting scrap was a slow process by oxygen lancing. Now this Oxweld C-60 Cutting Blowpipe mounted on a machine carriage and gantry rig does the job more quickly.

Snow Storm Starts Iron Ore Season Climax

Shipping tapers off . . . Will continue from Upper Lake ports to Dec. 15 but 90 smaller ships tied up now . . . Total to Dec. 1 is 77 million tons . . . Another million seen.

Cleveland—In the aftermath of one of the heaviest snowstorms in Lower Lakes history, the 1950 iron ore movement was tapering off this week.

Ore will continue to move from Upper Lake ports until Dec. 15, when the locks at the Soo close, but about 90 boats, mostly smaller carriers and those in need of repair, are already tied up for the season.

Lake movement of ore as of Dec. 1 totaled about 77,300,000 gross tons, and shippers hope another 1 million tons can be brought down before Dec. 15, raising Lake movement total to about 78,300,000 gross tons.

With an all-rail movement aimed at 3.5 million tons, those of the steel industry who depend principally on the Lake Superior district for tonnage ought to have enough ore to last until navigation opens next April. With an early start last spring, the 1950 iron ore movement might well have soared to a new peacetime record, according to shippers here.

The heavy snows of the past week did not materially affect the iron ore movement, although there was some rail congestion and unloading was delayed.

While the marine insurance has been extended to cover the late season movement, big fear of shippers now is bad weather in the Upper Lakes endangering ships and crews. An early fitting out is planned for next spring, but Great Lakes shipyards are loaded with work on the new carriers and facilities for repairs and fitting out will be taxed heavily.

Canada-U. S. Form Industrial Co-op for Defense Order Needs

Canadian firms can get U. S. material under U. S. priority system.

Ottawa—C. D. Howe, Canadian Minister of Trade and Commerce, announced that Canadian industry will be assured the necessary essential materials for both Canadian and U. S. defense orders under an "informal" priority system. The system is the practical result of the joint statement of principles for economic cooperation signed recently in Washington by Canada and the United States.

Shortage Item Is Steel

Mr. Howe stated that Canadian requirements from U. S. sources for defense orders will be met by extending the formal priority system now in effect in the U. S. to cover Canadian needs. The key item is steel, which is in very tight supply in Canada.

For its part the Canadian government is informing producers and suppliers of essential materials in this country to give equal priority to filling orders originating in the U. S. Suppliers of lumber, aluminum, copper, nickel, lead, and zinc are believed to be those most immediately involved.

Mr. Howe has standby powers to impose a formal priority system if necessary, but so far the government is working with industry on the voluntary level to see that defense needs are met.

Liaison With NPA

The projects division of the Dept. of Trade and Commerce will receive applications from Canadian defense manufacturers who desire the benefits of the U. S. priorities and will pass them on to the U. S. National Production Authority. If the department grants a rating, the Canadian manufacturer makes the appropriate notation on his purchase order to the U. S. supplier of the material he needs.

However, the rating must not be extended to cover materials for plant improvement or capital or maintenance equipment unless the defense order cannot be completed without such material, in which case further application must be made to the department.

If the material needed by the manufacturer for his defense order is Canadian-produced, priority assistance in obtaining it may be secured by application to the department, Mr. Howe stated.

Republic's White Claims Steel Expansion Has Been Wise, Adequate

C. E. Wilson, GM head, gives reasons why steel need estimates were low.

Detroit—The steel industry has expanded just as fast as good judgment backed by a wide streak of optimism would permit, C. M. White, president of Republic Steel Corp., told the Detroit Economic Club last week. C. E. Wilson, president of General Motors Corp., who differed last month with Edward Ryerson, chairman of the board of Inland Steel Corp., on expansion of steel, also spoke.

During the first 9 months of this year, Mr. Wilson said, the industry has shipped enough steel to build 1.1 million dwelling units; 6¼ million cars and trucks; 4½ million refrigerators; nearly 3½ million gas and electric stoves and nearly 3 million tons of metal cans. These productions constitute all-time records in these industries, he said.

"Wait here—I'll be out in a minute and I'll finish demonstrating this extension ladder."

Manpower Match Expansion?

The speaker also argued that there is not enough manpower in the country to fabricate the 120 million tons of steel the industry's critics claim are necessary. It would take 1.5 to 2.5 million additional workers to utilize another 20 million tons of steel, White said. Where are we going to get them with only about 2 million unemployed in the country?

In his remarks, C. E. Wilson cited the following reasons why forecasts of future steel requirements have been on the low side:

(1) The spread-the-work movement in the 30's contracted steel requirements at an unusually rapid rate.

(2) U. S. expansion from 45 million to 60 million workers was much greater than anticipated.

(3) Improved technology has increased the tons of steel required per worker.

Mr. Wilson said that on an average a workman at General Motors is now fabricating about 20 pct more material than he did 10 years ago.

Ohio Road Plans Purchase Of 400 Iron Ore Freight Cars

Mobile, Ala.—Plans to purchase 400 iron ore freight cars by the Gulf, Mobile, and Ohio Railroad indicate preparation for hauling of ore from U. S. Steel Corp.'s Cerro Bolivar field in Venezuela. The road has approved purchase of $8 million worth of freight cars —700 box cars, 300 gondolas, and the 400 ore cars.

Tennessee Coal & Iron Corp., a U. S. Steel subsidiary, has been experimentally mixing South American and domestic ores and has reportedly increased output by 20 pct. It is expected that production will be increased further when Cerro Bolivar ores, containing 60 pct iron, are mixed with the local product.

TCI recently bought the 32-acre slip and docks of the Turner Ter-

minal Co., here. At the time of purchase it was understood that incoming ore would be shipped from Mobile to Birmingham by barge. When Cerro Bolivar shipments will begin has not yet been disclosed.

A. J. McFarland, Wheeling Head Dies; In Industry 45 Years

Wheeling, W. Va.—A. J. McFarland, president of Wheeling Steel Corp., died last week in Ohio Valley General Hospital following a heart attack. Mr. McFarland was 67 years old and had been Wheeling president for the past 10 years. His death closed a 45 year career in the steel industry.

Mr. McFarland joined Wheeling in 1905 as messenger boy at Whitaker Glessner Steel Co., which later became Wheeling Steel. In 1912, Mr. McFarland was made general superintendent of the Wheeling plant at Portsmouth, Ohio.

Mr. McFarland later served for 6 years as superintendent of the Follansbee Bros. steel plant. In 1930 he returned to Wheeling Steel Corp. as vice-president.

Allocations for "Essential" Industry Cut Into Steel Output

Chicago—The NPA program of alloting materials to every "essential" industry may soon require most of the nation's steel output, Joseph L. Bloch, Inland Steel Co. vice-chairman, told the Chicago Assn. of Commerce and Industry.

By January, priorities, allocations and steel for his own company's expansion needs will take one-third of Inland's production for certain items, he said.

Barring an all out war, too many programs for "defense supporting" industries could rush the country into a managed economy, Mr. Bloch said. Two things could happen, he said. "Those industries left out in the cold will fold up and turn their employees out on the street or NPA will have to divide up all the steel." Either course would be wrong unless we are in a total war, he declared.

Supply Problems Stymie Freight Car Program

10,000 per month production rate not expected until May; confusion of ordering, shortage of parts is hamstringing freight car builders—*By E. C. Beaudet.*

Chicago—Freight car builders, faced with the tremendous job of correlating steel deliveries from mills and component parts from suppliers, will not start producing cars at the rate of 10,000 per month until some time in May, industry sources state.

Steel allocations to car builders start in January and normal lead time for production averages 2 months. But the assumption that the program would reach 10,000 per month by late March or April is not supported.

If a car builder could order his requirements and no more, from his normal sources of supply, he could get in production earlier. Tonnage set aside for the freight car program are enough to produce 10,000 cars a month. How it will be split up is another thing.

Some builders have tried to place total first quarter steel requirements during January. Mills have no way of knowing if a car builder is ordering more than he requires, or if he is placing orders with several mills. When other builders try to order they find allocation tonnage filled up. They are forced to seek tonnage from other sources, if able to get on the books, at higher shipping costs.

Lack of balanced car sets will hamper some operations. If a producer plans to build 100 box cars he needs 100 of each steel item going into that car. If short one or more of the items going into the car, production stops. This was illustrated recently when a builder ran short of bars and had to suspend operations. Meanwhile, he had to ask that steel shipments of other items be held up for lack of storage space.

Should Be Enough for All

Under the allocation system, mills set aside a certain tonnage of sheets, plates, bars and shapes. Barring over-ordering, enough of these items should be available to all.

However, within these classifications are products not made by all mills. Brake beam channels are made by only four U. S. mills. They are not rolled every month. If a builder cannot get on the books the month they are being rolled, brake beams become a critical item and production bogs.

This is true of many steel products. A few builders and parts makers feel some car items are not too profitable for mills.

A mill may book to its limit on shapes, but not produce enough of the type a car builder needs.

The question of who gets what and how much, and whether enough production time is being spent on items needed, must be straightened out soon.

Fairless Boosts Pirates

Pittsburgh — Ben Fairless, President of U. S. Steel Corp., and a former college and semi-pro baseball player, has been elected to the board of the Pittsburgh Pirates baseball team and will become a stockholder soon. John Galbreath, club president, made the announcement.

The steel executive was a catcher and a first baseman at Wooster College and Ohio Northern University, and later played semi-pro ball with the Agathon club of the Central Steel Co., Massillon, Ohio.

George Sisler, chief Pirate scout in the Pittsburgh area, recalled playing against Fairless in 1914.

"I was pitching for a semi-pro team in Akron," Sisler said. "Ben Fairless pitched for the other team. That's where he learned all about strikes."

Carnegie-Illinois Steel Corp. Prices

Pittsburgh—The following are f.o.b. mill prices of Carnegie-Illinois Steel Corp., effective Dec. 1. They apply on carload lots to sizes and shapes, etc., made at each mill. The former price is shown along with the revision and the change per net ton. (Prices are in cents per lb unless otherwise noted):

	Old	New	Increase per ton
CARBON STEEL:			
Blooms, billets, slabs—forging	$63	$66nt	$3
Blooms, billets, slabs—rerolling	$53	$56nt	3
Skelp	3.15	3.35	4
Bars and small shapes	3.45	3.70	5
Concrete reinforcing bars (new billet)	3.45	3.70	5
Standard structural shapes	3.40	3.65	5
CB's (Including CBL, CBJ and CB sections)	3.40	3.65	5
Bearing piles (CBP sections)	3.40	3.65	5
Sheet piling	4.20	4.45	5
Plates	3.50	3.70	4
Standard tee rails—No. 1 O.H.	3.40	3.60	4
Standard tee rails—No. 2 O.H.	3.30	3.50	4
Standard tee rails—All No. 2 O.H.	3.35	3.55	4
Light rails	3.75	4.00	5
Tie plates	4.20	4.50	6
Joint bars for standard rails	4.40	4.70	6
Hot rolled sheets (18 ga. and heavier)	3.35	3.60	5
H-R strip	3.25	3.50	5
Cold rolled sheets—commercial quality	4.10	4.35	5
Galvanized sheets (10 ga.—24" to 30" wide)			
Regular—10 gage	4.40	4.80	8
Culvert — 16 ga. copper bearing	5.20	5.60	8
Electrical sheets (22 ga.) (electrical grade)	6.70	7.25	11
HIGH STRENGTH STEEL PRODUCTS:			
USS Cor-Ten Standard structural shapes	...	5.50	..
CB sections	...	5.45	..
Plates	...	5.65	..
Bars and small shapes	...	5.55	..
Hot rolled sheets	...	5.40	..
Cold rolled sheets	...	6.55	..
USS Man-Ten Standard structural shapes	...	4.60	..
CB sections	...	4.65	..
Plates	...	4.75	..
Bars and small shapes	...	4.50	..
Hot rolled sheets	...	4.45	..
ABRASION RESISTING			
Bars and small shapes	...	4.85	..
Plates	...	4.85	..
Hot rolled sheets	...	4.75	..
ALLOY STEEL PRODUCTS:			
Blooms, billets, slabs-forging	66	$70nt	4
Ingots	51	$54nt	3
Hot rolled bars	3.95	4.30	7
Bar shapes	...	4.55	..
Plates	4.40	4.75	7
Structural shapes	...	4.35	..
Strip, hot rolled	4.95	5.50	11
STAINLESS STEEL (30) PRODUCTS:			
Billets & slabs—rerolling	...	19.75	..
Billets—forging	...	26.25	..
Bars, hot rolled & cold rolled	...	31.25	..
Plates	...	33.00	..
Sheets	...	41.00	..
Structural shapes	...	31.25	..
Strip, hot rolled	...	28.00	..
OTHER ITEMS:			
Long ternes	5.20	8.00	..
Enameling sheets	4.65	5.00	..
Galvaneal	5.35	8.00	..
Hollware, enameling sheets	4.35	5.00	..

Ask Higher Freight Rates in East

Washington—Eastern railroads have petitioned the Interstate Commerce Commission for a freight rate increase East of the Mississippi and North of the Ohio and Potomac Rivers.

An increase of 4 pct is sought for all freight except coal. A flat increase of 12¢ a net ton or 13¢ a gross ton as rated is asked for coal.

The increase would apply to handling charges on iron ore at the Lower Lake ports but no change is asked for storage charges at those ports.

If granted, the higher rates would apply also to freight shipped into and from the general area. Switching, terminal, and accessorial charges would likewise take the increase.

Pressed Metal and Defense

Chicago—To help metal fabricators in this area determine how they fit into the defense program, a top procurement expert from each branch of the armed services will be present at the Dec. 13 Graemere Hotel technical session of the Pressed Metal Institute's Chicago chapter. Procurement officials will discuss where to go and who to see about defense orders. They will also discuss what should be known about bidding, priorities and the metal parts they buy.

Revise Lead Time in Steel Orders for More Efficient Output

Washington — Amendments to steel orders NPA M-1 and NPA M-6 have revised the lead time provisions on defense orders looking to more efficient production schedules.

In addition, M-1 has been amended to require that integrated mills make equitable allotments each month, after rated and special defense program orders are filled, to non-integrated mills on their lists.

This latter provision is necessary, NPA says, because of the substantial tonnages which non-integrated mills supply to steel warehouses.

The amended orders stipulate, product by product, the minimum required delivery time on rated orders and the portion of each product which each steel producer and warehouse is required to divert toward rated orders.

Better Able to Meet Shortages

Pittsfield, Mass. — Future national emergencies will find American industry better able to meet critical material shortages than in World War II, James D. Nisbet, head of General Electric Research Laboratory, told a meeting of the American Institute of Electrical Engineers and Berkshire Society of Metals.

Discussing titanium, the metallurgist said titanium alloys have properties comparable to steel. The metal weighs about 60 pct of steel and is corrosion resistant.

While fourth most abundant metal in the earth's crust, its use is limited by high cost of processing.

Claim Gapless Ring Adds Power

Fort Worth, Texas—Closed gaps between the ends of piston rings in Diesel engines give more power with less consumption of fuel and lubrication oil and reduce engine overhauls, according to a survey conducted by the Double Seal Ring Co.

USS Steel Export Prices

New York—United States Steel Export Co. has announced price changes effective Dec. 1. Prices are in cents per lb unless otherwise noted, and include freight to New York, Phila., or Baltimore.

CARBON STEELS	Net ton
Billets, Blooms and Slabs	
Re-rolling quality	$64.71
Forging quality	74.71
Tube rounds	90.71
	Per 100 lbs
Std. structural shapes	4.17
C.B. sections, bearing piles	4.17
Plain plates	4.22
Floor plates	5.27
H-R bars	4.24
Reinforcing bars	4.24
Steel sheet piling	4.97
Cooperage hoop	4.19
Skelp	3.89
Sheets:	
H-R 18 ga. and heavier	4.35
Cold-rolled	5.10
Galvanized, plain	5.65
Vitrenamel	5.50
Electrical sheets, hot rolled:	
Armature grade	7.52
Electrical grade, cut lengths, 22 ga.	8.02
Motor	9.02
Dynamo	9.82
Transformer 136	10.12
Transformer 127	10.37
Transformer 115	10.92
Transformer 103	11.62
Transformer 98	12.12
Transformer 93	12.42
Hot rolled strip	4.04
Rails and fastenings:	
Std.—61 lbs and over	85.65 n.t.
Light—60 lbs and under	91.36 n.t.
	Per 100 lbs
Joint bars for std. rails	5.82
Tieplates	5.82

WIRE PRODUCTS:	Per 100 lbs
Wire rods	$4.54
C-R strip (.25 carbon and under)	5.21
Cold-finished bars	5.11
Bright nail wire	5.37
Black annealed wire	5.97
Galvanized plain wire	6.42
Barbed wire:	per 80 rod spool
Lyman 4 pt. 5 in.	6.51
	Per 100 lbs
Glidden 4 pt. 3" or 6"	7.58
Iowa 4 pt. 3" or 6"	7.58
Waukegan 4 pt. 3" or 6"	7.58
Nails and staples:	
Bright	6.48
American standard pipe T & C	
Buttweld, 2½" and 3":	
Black	37.9% disc.
Galvanized	18.4% disc.
Seamless:	
2" Black	23.9% disc.
2" Galvanized	3.9% disc.
2½" and 3" Black	26.9% disc.
2½" and 3" Galvanized	6.9% disc.
3½" and 4" Black	28.9% disc.
3½" and 4" Galvanized	8.9% disc.
5" and 6" Black	31.4% disc.
5" and 6" Galvanized	11.4% disc.
English Gas Tubes T & C:	
Buttweld 2½" and 3":	
Black	36.8% disc.
Galvanized	20.3% disc.

ALLOY, HIGH STRENGTH STEELS:	
Alloy:	Per net ton
Billets, blooms and slabs	$78.71
	Per 100 lbs
H-R bars	4.82
H-R bar shapes	5.07
Plates	5.27
Standard structural shapes	4.87
H-R strip	6.04
Cold finished bars	6.01
High strength corten:	
Plates	6.17
Std. structural shapes	6.02
C.B. sections	5.97
H-R sheets	6.15
C-R sheets	7.25
H-R bars, bar shapes	6.07
Manten:	
Plates	5.27
Std. structural shapes	5.12
C.B. sections	5.17
H-R bars and bar shapes	5.02
H-R sheets	5.20

NPA's Two Copper Orders Set DO Ceilings, Limit Civilian Use

Order M-12 cuts non-defense output in first quarter of 1951.

Washington—Long-awaited copper regulations were issued last week in the form of two NPA Orders, M-11 and M-12, which establish percentage ceilings for acceptance of rated orders and cuts back non-defense consumption of brass mill and copper products during first quarter 1951.

Order M-12 limits non-defense production and use by weight to 85 pct during January and February and to 80 pct during March. Foundry products are limited to 100 pct of the average for the base period—first six months 1950.

Also, the December limitation is 100 pct of the October-November 1950 monthly average.

Producers, Sellers, Owners

Order M-11 covers producers, sellers and owners of refined copper and copper-base alloy ingot, producers of brass mill, copper wire and foundry copper-base alloy products, and distributors, jobbers and warehousers of copper and copper-base alloy. It also covers both unalloyed copper and copper-base alloy (40 pct and up by weight), including all scrap.

Under the order, rated orders for brass mill products need not be accepted in any one month in excess of 5 pct of the base period (first 6 months 1950) monthly average for unalloyed and alloyed pipe and tubing; 15 pct for unalloyed rod, bar, and wire; 20 pct for alloyed rod, bar and wire; 25 pct for alloyed and unalloyed plate, sheet and strip; and 15 pct for all other.

But, orders for copper wire mill products for any type or size range do not have to be accepted for shipment in any one month in excess of 15 pct of the base period average. In the case of foundry copper or copper-base alloy products, the total acceptance may be limited to 10 pct of total average tonnage.

Total tonnage limits for acceptance of rated orders are provided

Cites DO Abuses

Washington—Munitions Board Chairman Small has asked the Military Services to police and report "abuses" of the DO priority rating system. Reports have reached the Board that some contractors are asking delivery dates far in advance of need and others are placing duplicate orders with intent of accepting the first delivery.

These practices cause an overload of rated orders and disrupt distribution for non-defense use, Small said.

at 20 pct for brass mill products; 5 pct for copper wire mill products; and 10 pct for foundry copper and copper-base alloy products.

As in the case of steel, provision is made for establishment from time to time of scheduled programs for support of the defense program.

Weirton Steel Pact Gives Workers 15¢ an Hour Increase

Pittsburgh—The contract between Weirton Steel Co. and the Independent Steel Workers union provides for an across-the-board 15¢ per hr wage increase for 11,500 production and maintenance workers, effective Dec. 1.

The agreement also provides for a ½¢ increase in increases between job classes, to 5¢; elimination of intermediate job rates and the establishment of 31 standard job classifications.

Job class 1, the lowest rate, advances from $1.26½ to $1.41½ per hr. A joint company-union statement described this as the highest in the steel industry. Workers in job class 31 will receive $2.91½ per hr.

Increases range from 15¢ to 30¢. Employees whose average earnings are above the class 31 rate receive a uniform increase of 30¢ per hr.

Pay boosts for combination hourly, piecework, or tonnage employees will be based on their average straight time earnings per

hr in the first 6 months of 1950. As for workers formerly paid an intermediate job rate, the hourly, piecework, and tonnage employees whose average rate falls between two job classifications will be paid on the basis of the next higher job class.

Salaried employees will receive an increase of 10 pct, with a minimum boost of $25 per month, also effective Dec. 1.

NPA Order Limits Cobalt Stocks

Washington — The National Production Authority last week issued NPA Order M-10 which limited cobalt inventories to a 20-day working level and sharply curtailed deliveries to consumers during December.

The distribution portion of the order instructs the lone importer (African Metals Corp.) to fill DO-rated orders to 60 pct of amounts ordered. Unrated orders are to get only 50 pct of average monthly receipts during the base period of first-half 1950.

Meetings are being held with cobalt-using industries to work out a long-range program, expected ready by Jan. 1.

The curtailment of December orders, both military and non-defense, was necessary because orders on hand this month totaled three times available supplies.

TCI Workers Get 4½¢ Hour More

Birmingham — Salary increases approved for U. S. Steel subsidiaries will amount to 4½¢ per hr more for employees of Tennessee Coal, Iron & Railroad Co. here than for the company's subsidiaries in the North, or a 20½¢ per hr increase instead of the 16¢ received elsewhere.

This reduces the North-South wage differential from 14½¢ to 10¢, a U. S. Steel announcement stated.

ISIS Southern Chapter President

Greensboro, N. C.—Hyman Helbein, formerly first vice-president of the Southern chapter of the Institute of Scrap Iron & Steel, was elected president at a recent meeting here.

STEEL CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

1500 **Tons,** Philadelphia, 30 in. welded steel pipe for Philadelphia Gas Works Co., to Bethlehem Steel Co., Bethlehem.

400 **Tons,** Wilmington, Del., railroad bridge for Pennsylvania R.R., to Morris Wheeler, Philadelphia.

360 **Tons,** Cumberland County, Pa., bridge for Pennsylvania State Highway and Bridge Authority, to Bethlehem Steel Co., Bethlehem.

250 **Tons,** Abington, Mass., junior high school through Park Construction Co., Boston, to West End Iron Works, Cambridge, Mass.

150 **Tons,** Manchester, Mass., elementary school through Walsh Construction Co., Boston, to West End Iron Works, Cambridge, Mass.

140 **Tons,** Northumberland County, Pa., bridge for Pennsylvania Dept. of Highways, to American Bridge Co., Pittsburgh.

Fabricated steel inquiries this week included the following:

1775 **tons,** Long Beach, Calif., by Port Manager, 1333 El Embarcadero, Long Beach, for construction Anaheim Street bridge over Los Angeles Co. Flood Control Channel (Contract No. 2), Spec. HD No. 310, bids to Dec. 19.

1440 **Tons,** Pittsburgh, 3 deck-plate, girder bridges and viaduct on Route LR 766 for Pennsylvania Dept. of Highways, bids due Dec. 28.

1069 **Tons,** Montgomery County, Pa. Construction of divided highway, seven (7) reinforced concrete structures, one (1) plate girder bridge and four (4) I-beam bridges. Pennsylvania Department of Highways, Harrisburg, Pa. Bids due Dec. 27, 1950.

870 **Tons,** Reading, Pa., concrete deck, girder beam highway bridge for Pennsylvania Dept. of Highways, bids due Dec. 28.

607 **Tons,** Lehigh County, Pa. Construction of divided highway, one (1) deck plate girder bridge and three (3) deck I-beam bridges. Pennsylvania Department of Highways, Harrisburg, Pa. Bids due Dec. 27, 1950.

404 **Tons,** Sacramento, Calif., by Calif. Div. of Highways, Public Works Bldg., Sacramento, for grade, cement concrete and plantmix surfacing and construction grade separation structures and bridges between Alamo Creek & Ulatis Creek, Solano Co., Calif., under contract (X-Sol-7-C, Vac, D); bids to Dec. 20.

387 **Tons,** Berkshire, Vt., 3 span continuous beam bridge with concrete floor beginning at the intersection of Route 105 and 118 in East Berkshire. G. A. Pierce, St. Albans, Vt., district highway commissioner. Completion date Dec. 1, 1951.

250 **Tons,** Vineland, N. J., retail store for Sears, Roebuck Co., bids due Dec. 13.

175 **Tons,** Indiana County, Pa., beam bridge, Pennsylvania Dept. of Highways, bids due Dec. 27.

108 **Tons,** Beaver Falls, Pa., 2 highway bridges, Pennsylvania Dept. of Highways, bids due Dec. 28.

Reinforcing bar awards this week included the following:

1600 **Tons,** Dayton, Ohio, Frigidaire Div., GMC, to U. S. Steel Supply Co.

530 **Tons,** Easton, Pa., plant addition to Dixie Drinking Cup Co., Lauter Construction Co., Philadelphia, general contractor, to Bethlehem Steel Co., Bethlehem.

Turn Page

Steel News Construction

Continued

505 **Tons,** Chicago, Ill., Hall Printing Co. to Joseph T. Ryerson and Son, Chicago.

460 **Tons,** Cicero, Ill., Sunbeam Electric Co. to Ceco Steel Products Co., Chicago.

160 **Tons,** Palatine, Ill., high school addition to Ceco Steel Products Co., Chicago.

150 **Tons,** Wilmington, Del., Garage No. 2 for Darling Apts., to Bethlehem Steel Co., Bethlehem.

135 **Tons,** Bellwood, Ill., Illinois Bell Telephone Co. to Joseph T. Ryerson and Son, Chicago.

127 **Tons,** Luzerne County, Pa., bridges on Route 40033, Sect. 5 and 7, Pennsylvania Dept. of Highways, B. G. Koon Construction Co., Wilkes-Barre, general contractor, to Bethlehem Steel Co., Bethlehem.

120 **Tons,** East Chicago, Ind., Linde Air Products Co., to U. S. Steel Supply Co., Chicago.

120 **Tons,** Chicago, Mrs. Snyder's Candy Co., to Bethlehem Steel Corp.

110 **Tons,** St. Joseph, Mich., Trinity Lutheran Church to Ceco Steel Products Co., Chicago.

100 **Tons,** Pennsgrove, N. J., new school building, H. Evans Co., Philadelphia, general contractor, to Bethlehem Steel Co., Bethlehem.

Reinforcing bar inquiries this week included the following:

1000 **Tons,** Everly, Ohio, American Gas and Electric Co.

1000 **Tons,** Great Lakes, Ill., housing project.

525 **Tons,** Montgomery County, Pa. Construction of divided highway, seven (7) reinforced concrete structures, one (1) plate girder bridge and four (4) I-beam bridges. Pennsylvania Department of Highways, Harrisburg, Pa. Bids due Dec. 27, 1950.

435 **Tons,** Long Beach, Calif., by Port Manager, 1333 El Embarcadero, Long Beach, for construction Anaheim Street bridge over Los Angeles Co. Flood Control Channel (Contract No. 2), Spec. HD No. 310; bids to Dec. 19.

229 **Tons,** Lehigh County, Pa. Construction of divided highway, one (1) deck plate girder bridge and three (3) deck I-beam bridges. Pennsylvania Department of Highways, Harrisburg, Pa. Bids due Dec. 27, 1950.

200 **Tons,** Chicago, Continental Products Co.

175 **Tons,** Dayton, Ohio, Oakview School.

165 **Tons,** Oak Park, Ill., St. Vincent's Church.

159 **Tons,** Sacramento, Calif., by Calif. Div. of Highways, Public Works Bldg., Sacramento, for grade and plantmix surfacing and construction bridges, installing traf. signals, etc., between Ignacio and Forbes Overhead, Marin County; bids to Dec. 20.

124 **Tons,** Sacramento, Calif., by Calif. Div. of Highways, Public Works Bldg., Sacramento, for grade, cement concrete pave and construction five concrete bridges between 1 mi. north of Goshen & Traver, Tulare County, Calif.; bids to Dec. 27.

110 **Tons,** Barrington, Ill., Jewel Tea Co. addition.

105 **Tons,** Bismarck, N. D., bar joists for high school.

100 **Tons,** Brookings, S. D., agricultural building.

Opens Wing to Warehouse

Chicago—With the opening of general offices and one wing of its new warehouse, Emergency Steel Service will have completed one step in its new expansion program. Located in suburban Skokie, the new wing is set up to handle 6000 tons of steel as well as provide space for two Cincinnati shears and several presses for light fabrication.

Gray Iron Castings Show Rise

Washington — September shipments of gray iron castings, 1,159,240 short tons, were 11 pct above August and 38 pct above September 1949, on an average working-day basis, according to the Dept. of Commerce.

September shipments of steel barrels and drums, on a similar basis, totaled 3,292,119, an increase of 2 pct over August and 8 pct above September of 1949, the Department reports.

NSRB to Reform Planning Group

New York—A conservation coordinating committee similar to that operated during World War II will be recreated by the National Security Resources Board as part of a drive for conservation in mobilization planning, it was announced by H. C. Coonley, NSRB planning specialist, at the annual meeting of the American Society of Mechanical Engineers.

H. C. Knowles Gets ASME Medal

New York—The ASME medal, highest award of the American Society of Mechanical Engineers, has been awarded to Harvey C. Knowles, vice-president of Procter & Gamble Defense Corp., for contributions to process industries and loading of ammunition. Mr. Knowles also holds the Rice Gold medal of the Army Ordnance Assn. for similar work.

Firms Join Warehouse Assn.

Cleveland — The Kenilworth Steel Co., Kenilworth, N. J., and Ward Steel Service Co., Dayton, Ohio, have been made active members of the American Warehouse Assn. Rigidized Metals Corp., Buffalo, N. Y., has joined as an associate member.

NE Council Membership 2500

Boston — Abrasive Products, Inc., of South Braintree, Mass., became the 2500th member of the New England Council, according to a recent announcement. The company manufactures abrasive cloths and papers.

Prepare for Large Attendance At March Western Metal Congress

Cleveland—Preparations are being made for a large attendance at the seventh Western Metal Congress and Exposition, which will be held in Oakland, Calif., Civic Auditorium and Exposition Hall, Mar. 19 to 23, 1951, W. H. Eisenman, ASM national secretary, announced here.

Technical sessions of the Congress will feature nearly 100 authoritative speakers who will deliver papers on recent developments in the making, working, fabricating, treating and application of metals.

Mr. Eisenman said the show will be sponsored, as in the past, by ASM in cooperation with 20 other national technical societies.

"Production for America"

Mr. Eisenman, who managed the six previous Western Metal events and directed the National Metal Exposition and Congress at 32 successive showings, expects to be in the West by Dec. 1. His headquarters until end of the meeting will be in Exposition Hall, 918 Fallon Street, Oakland, Calif.

In keeping with increased demands imposed on the metal industry, the theme for exhibits and speakers will be "Production for America". Displays and papers will be based on application of metals in the oil, chemical, manufacturing, aviation, construction, mining and other industries.

Mr. Eisenman reported more than 50 pct of exhibit space already has been assigned to western, mid-western and eastern producers.

A local committee, headed by Harry E. Lewis, 400 Channing Avenue, Palo Alto, Calif., chairman of the Golden Gate Chapter, ASM, has held several meetings to pave the way in the western states for the show and congress.

Harry E. Krayenbuhl, Oliver United Filters, Inc., Oakland, is general secretary. Vice-chairmen are Bertram W. Depew, General Electric Co., San Francisco;

Philip McCaffery, General Metals Corp., Oakland, and E. A. Daniels, Victor Equipment Co., San Francisco. Mr. Daniels is special representative of the American Welding Society on the general committee.

Safety Savings Go to Towns

Pittsburgh — Savings realized through a reduction in accidents during 1949 are being distributed by Jones & Laughlin Steel Corp. to welfare and hospital facilities in communities in which the company operates plants, mines, and warehouses.

The "Safety Savings" total $69,050. Checks being distributed to the various communities range from $100 to $13,775. The savings are computed on the basis of the reduction in the number and severity of accidents from a base 5-year period starting in 1946.

Build Textile Plant

Kollocks, S. C.—A new million dollar textile finishing plant will be built by the Delta Finishing Co., a division of J. P. Stevens and Co., of this city. Electric drive equipment for textile ranges and other finishing machinery will be furnished by General Electric. The new plant will cover more than 200,000 sq ft of floor space.

To Build Ventilating Shaft

Pittsburgh—A new ventilating shaft for Jones & Laughlin Steel Corp.'s Shannopin Mine near Bobtown, Pa., will be constructed by the Shaft & Tunnel Department of Dravo Corp. The concrete-lined shaft with inside dimensions of 12 ft 6 in. by 35 ft will go down 175 ft.

Show Film on Studwelding

Lorain, Ohio—Uses of studwelding in construction, railroad and metalworking industries is shown in a color sound film, "Split Second Fastening". It is now being exhibited to an average of more than 600 persons and 20 groups a month.

Replacement Sales Increase

Chicago—A sharp increase in replacement sales characterized the appliance business since start of the "Korean market," according to E. E. McEwan, of Hotpoint, Inc. Refrigerator replacement sales jumped from a normal 50 pct to 72 pct. Looking to 1951, Mr. McEwan predicted production of 1,350,000 ranges and 1,500,000 automatic washers.

Consumer Prices Climb Higher

New York—Setting a record high, consumer prices for the nation's large cities continued their upward march for the eighth consecutive month during the Sept. 15 to Oct. 15 period, according to a Bureau of Labor Report. The report placed the consumer price index in mid-October at 174.8 of 1935-39 average.

Builders' Backlog $19 Million

New York—A backlog of $19 million in construction contracts for several hospitals, a department store, office building, apartment house, and a sewage disposal plant was announced by J. R. Van Raalte, president of Thompson-Starrett Co., Inc., at the company's 51st annual meeting.

Stress Studies Show Results

New York—Efficiency and reliability of boilers today is largely due to 25 years' study in the properties and behavior of metals under long-time exposure to stress at high temperatures, John B. Romer and Harold D. Newell, of Babcock & Wilcox, told the annual meeting of the American Society of Mechanical Engineers.

Construction Worker Training

Washington—Impending manpower demands make a continuing supply of skilled workers for the construction industry imperative, according to a pamphlet, "Related Instruction—A Key to Apprentice Training in Construction," issued by the United States Chamber of Commerce.

1. Carpet Sweeper—Bissell
2. Vacuum Cleaner—Eureka
3. Vacuum Cleaner—Electrolux
4. Kitchen Tools—Elco Products
5. Portable Typewriter—Underwood
6. Toaster—Procter
7. Radio—RCA Victor
8. Can Opener—Dazey
9. License Frames—Cello Products
10. Corn Popper—Knapp Monarch
11. Waffle Iron—Knapp Monarch
12. Lighter—American Safety Razor
13. Gem Razor—American Safety Razor
14. Cap Pistol—All Metal Products
15. Tru-Heat Iron—General Mills
16. Flashlight—Elco Products
17. Hopalong Cassidy Skates—Rollfast
18. Ice Crusher—Dazey

Gleaming gifts for a Christmas bright with precision plating by Udylite

The attractive appearance of the gifts is due in no small part to their gleaming metal finish—imparted by Udylite equipment and processes. For manufacturers have recognized that Udylite can show them effective, economical methods of giving their products the kind of finish that brings out the inherent beauty of metals—and gives lasting protection. Call a Udylite Technical Man into your plant to show you the Udylite method of achieving lasting lustre and protective coating at lower cost. Or write direct to The Udylite Corporation, Detroit 11, Michigan.

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TESTED SOLUTIONS • TAILORED EQUIPMENT
AUTOMATIC CONTROL IN METAL FINISHING

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

TCI Push Button Coal Mine Will Produce 7800 Tons Per Day

Grading, washing done below ground . . . Conveyer takes coal to cars.

Birmingham—The Concord mine of Tennessee Coal, Iron & R.R. Co., largest coal mine in the South and one of the most modern in the country, was formally opened recently. Some 250 mine operators, businessmen, industrialists and suppliers were present.

The $4½ million development was designed by T.C.I. engineers to meet particular requirements at Concord. It is mechanized throughout and operated from an electrical control panel.

Unlike the conventional mine, Concord is almost spotlessly clean. The mine has attracted attention of coal operators all over the country. In addition to a coal mine, a coal preparation plant is operated in which millions of gallons of water are used daily.

Mile-Long Conveyer

Machines cut the coal from the wall, then the coal is passed to other machinery for crushing, blending, sizing, separation of the coal from rock, and washing. The coal comes to the surface on a mile-long rubber conveyer and is dumped into cars for delivery to the T.C.I. coke plant.

The 8-level mine has a factory-type layout and provides streamlined handling. At present 900 men are employed and this number may be increased to 1200. In full operation the mine is expected to produce 7800 tons of coal per day. The conveyer belt will carry more than 1000 tons per hour up a 700 ft slope.

New Lansdale Plant Planned

Lansdale, Pa.—Lansdale Tube Co., a Philco Corp. subsidiary, has purchased ground at Frederick, Md., to build a new plant for production of electronic tubes. Construction will begin early in 1951. It is expected the plant will employ about 1000. Philco is also considering erection of another plant in Philadelphia.

British Consumers Probing Market for More Steel Tonnage

London—Increasing pressure of demand in the British iron and steel market is reviving thoughts about the possibility of reactivating the official distribution plan.

Both steel producers and consumers are opposed to such action at the present time, feeling that it is not needed—yet. Although all producers are feeling the impact of very strong demand, actual consumption probably hasn't risen to the degree that order books of steel companies would suggest.

With full employment and production at all consuming plants, there hasn't been much room for increasing consumption — except by speeding production schedules and starting new plants.

On the whole enough steel is expected to be available on the home market to keep metalworking plants going full tilt. To make this possible it may be necessary to continue starving the export market.

Stockpiles are still reasonably good. But all consumers are anxious to add to their steel inventories. It is this precautionary buying which is largely responsible for the great flurry which has risen in the steel market recently. The Korean situation and rearmament plans have made consumers anxious to obtain all the steel of all types that they can persuade steel companies to ship them.

Sizer Elected to ASA Board

New York—H. S. Sizer has been elected to the board of directors of the American Standards Assn. for a 3-year term, according to an announcement made at the annual meeting of the ASA.

Holland Group Visits Lukens

Coatesville, Pa.—Twenty steelmen and welding specialists from the Netherlands were scheduled to visit Lukens Steel Co. this week as part of a program sponsored by the Economic Cooperation Administration to help Europe increase production.

New Wind Tunnel Testing High Speed Missiles of Future

Pasadena, Calif. — Speeds of more than 10 times the velocity of sound are being obtained in the new hypersonic wind tunnel at the California Institute of Technology here.

The tunnel was designed and built for the Institute and Army Ordnance Dept. to provide vitally needed information for use in the design of future missiles at speeds well above those of present-day rockets and missiles.

The test section in which models are mounted is only 5 x 5 in., although the tunnel has an overall length of 4 ft. This includes a region of acceleration downstream from the nozzle throat, the test section, and the diffuser section, where the air is slowed down.

To accelerate in the expansion section, air must pass through a slot in the throat of a specially designed alloy steel nozzle. Height of the slot depends on the Mach number desired. At a speed of Mach 10, air at tremendous pressure blasts through a tiny slit less than 0.005 of an in. high, about the thickness of a sheet of paper. When the air suddenly expands into the test section, the temperature drops to about minus 430°F, while pressure drops to about one millimeter of mercury, or 0.001 of normal atmospheric pressure.

Air at pressures as high as 1000 psi is provided by rotary vane type and double-acting reciprocating type compressors. The compressors, located in the basement are driven by 6 General Electric motors.

TVA, Army Plan Research Lab

Muscle Shoals, Ala.—Charles H. Young, director of TVA's division of chemical engineering, has announced the new plant for research on phosphorus by-products will be located on the TVA reservation. It will be jointly directed by TVA and the U. S. Army.

Contract for design and construction of the laboratory has been awarded by the Army Corps of Engineers to the Kellex Corporation of New York.

Time and Cost Saving Features

TYPE "A" ASSEMBLY BIT

ON WHICH CLUTCH HEAD CHALLENGES COMPARISON WITH ANY AND ALL OTHER SCREWS

1. ***What Other Screw*** equals the high visibility of the CLUTCH HEAD recess to check out the slow-down of hesitation . . . even with "green" operators?
2. ***What Other Screw*** frees the line from burred and chewed-up heads with automatic straight driving . . . with Center Pivot entry that prevents driver canting?
3. ***What Other Screw*** has a non-tapered driving engagement (without dangerous "ride-out" as set up by tapered driving) to eliminate the hazard of skid damage? . . . and the need for fatiguing end pressure?
4. ***What Other Screw*** provides a simple Lock-On which unites screw and bit as a unit to hurdle "fumble spots" by permitting one-handed reaching and driving from any angle?
5. ***What Other Driver*** can begin to approach the durability record of the rugged Type "A" Bit . . . 214,000 screws driven non-stop?
6. ***What Other Assembly Bit*** can be *repeatedly* reconditioned on the spot by a 60-second application of the end surface to a grinding wheel . . . for unmatched tool economy.
7. ***What Other Modern Screw*** has a recess basically designed for operation with a common screwdriver . . . for the simplification of field service adjustments?

COMMON SCREWDRIVER

According to users of CLUTCH HEAD *Screws, you may confidently expect these time- and cost-saving features to deliver assembly production increases ranging from 15% to 50%.*

CLUTCH HEAD SCREWS

The New CLUTCH HEAD *Brochure details and illustrates the exclusive advantages of America's Most Modern Screw. Your copy will come to you by mail on request . . . mentioning the types and sizes of screws in which you are interested.*

UNITED SCREW AND BOLT CORPORATION

CLEVELAND 2 CHICAGO 8 NEW YORK 7

Europeans Urged to Cut Coal Stockpiles to the Bone

Geneva—Coal and coke importing countries of Europe were urged to refrain from unnecessary stockpiling this winter and producing countries were encouraged to expand export availabilities as much as possible at a recent meeting of the Coal Trade Sub-Committee of the United Nations Economic Commission for Europe.

Coke Supplies Tightest

The appeals resulted from the marked deterioration in the coal supply position revealed in the subcommittee's review of Europe's solid fuels situation for the rest of this year and the first quarter of 1951. Although last summer there was an European overall surplus of more than 3 million tons of coal and coke, an overall deficit is now expected during the next 5 months or so by competent observers.

Supplies of metallurgical coke threaten to be especially tight. The 16 - country subcommittee didn't release any of its forecast figures which it still hopes may be revised on the basis of its appeals.

Demand Climbs Sharply

Since September, demand for solid fuels has grown sharply. General increases in industrial activity, especially in iron and steel production, plus the normal increase of winter requirements, electricity and gas needs explain part of the rise in coal and coke requirements declared by the European countries. Experts also believe some of the increased demand is inflated in an effort to rebuild stocks of fuels that have been steadily declining.

Meanwhile, coal output in virtually all European countries has been below their goals in recent months—because of industry policies and variable labor supply. Reduced pithead stocks only make the problem confronting Europe more acute.

Newport Steel Plans New Dock

Louisville—Construction of new docking facilities in the Licking River may be undertaken by Newport Steel Corp. by next spring. The corporation requested an extension of time to permit such construction from the Corps of Engineers here.

Completion of the project about 2 miles south of the river's mouth would permit increased water shipment of raw materials into the plant and finished products to the corporation's customers. A dock at the rolling mill about a mile north of the proposed new facility permits some use of the Licking and Ohio Rivers now. But the company hopes to take even greater advantage of cheaper water freight.

Detroit Steel Engineers Meet

Detroit—Detroit District Section, Assn. of Iron and Steel Engineers, held an "Algoma Steel Corp. Night" at Detroit on Nov. 14. William J. Reilly, Ford Motor Co., succeeds the late William E. Reiber, Great Lakes Steel Corp., as chairman of the Detroit Section. Vice-president is Robert Sergeson, Rotary Electric Steel Corp.

Plan Billet Heating Furnace

Kokomo, Ind.—A single-zone pusher type billet heating furnace, with a capacity of 60 tons of 2½ in. x 2½ in. x 30 ft steel bars per hour is being designed for Continental Steel Corp. by Salem Engineering Co. Construction will start in 1951.

Jet Cooling Methods Described

New York—Unique methods of rocket and jet engine cooling, developed to cope with higher gas temperatures necessary for more power and better fuel efficiency, were described at a recent meeting of the American Society of Mechanical Engineers by Allan P. Colburn, University of Delaware provost.

He cited three methods under consideration: (1) "Sweat cooling," where coolant is forced through the metal either in transverse holes or pores and is then vaporized on the hot surface; (2) a cooling liquid used below its boiling point but with local boiling taking place; (3) use of highly efficient heat exchangers.

Build Largest Alkyd Resin Unit

Pittsburgh—The Chemical Plants Div. of Blaw-Knox Construction Co. is designing and building one of the world's largest single-kettle alkyd resin production units for the Jones-Dabney Div. of the Devoe & Raynolds Co., Louisville, Ky. The processing equipment will be made of stainless steel and heated and cooled by Dowtherm.

Starts Traveling Training

Chicago—Two mobile training units, mounted in semi-trailers and containing working models, charts, and motion picture films of tractor components, are being sent to the district offices and maintenance shops of the International Harvester Co. as part of an extensive service training program.

Nodular Iron for Stressed Parts

Mt. Vernon, Ohio—Parts subject to severe mechanical service will soon be made of nodular iron, according to T. E. Eagan, chief metallurgist of Cooper-Bessemer Corp. Stressed engine and compressor parts, such as shafts and pistons, previously made of steel forgings or castings, can now be made of nodular iron.

Do You Know

WHAT CAUSES BREAKDOWNS... REJECTIONS IN AUTOMATIC MACHINES?

Fastax High-Speed Motion Picture Studies Have Been Made of:

- Machine Shop Tools Working.
- Failure of Rapidly Moving Mechanisms.
- Faulty Design Problems such as shattering relay contacts and cams.
- Gas and Liquid Flow . . . Combustion.
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WRITE for catalog and information on how Wollensak can equip a high-speed laboratory for you . . . Completely portable and easy to use. Wollensak Optical Co., 808 Hudson Avenue, Rochester 21, N. Y.

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MEANS FINE LENSES

Electroplaters to Meet Jan. 27

Chicago—The annual meeting of the Chicago chapter of the American Electroplaters' Society will be held Jan. 27, 1951, at the Stevens Hotel. A symposium on the preparation of metals for plating will be held at 2:30 p.m.

Speakers include C. F. Nixon, Jernstedt Div. of General Motors, who will talk on "Polishing and Buffing"; Dr. Foster D. Snell, Foster D. Snell, Inc., whose subject will be "Emulsion-Solvent-Alkaline Cleaning," and Dr. Cloyd O. Snavely, Battelle Memorial Institute, who will speak on "Pickling and Bright Dipping."

Ore Carriers Have Record Month

Cleveland—Great Lakes bulk carriers moved 11,380,306 gross tons of iron ore in October, third highest October movement in history, Lake Carriers' Assn. reported here. The movement was exceeded only in 1942 and 1943.

Coal carried in October, 6,462,102 net tons, marked the fifth month this season in which the 6,000,000-ton mark has been exceeded.

Before October ended, the season's shipment of iron ore had eclipsed the full season mark for last year, and by Nov. 1 the cumulative 70,339,895 gross tons total was nearly a million tons ahead of the season figure for 1949.

Cutback Cuts Controls Output

Philadelphia — Production of industrial measuring and control instruments, vital in defense production efficiency, will be seriously affected by NPA's 35 pct aluminum cutback order if a priority rating is not obtained, according to Henry F. Dever, president of Brown Instruments Division of Minneapolis-Honeywell Regulator Co.

Gunnison Homes to Expand

New Albany, Ind.—U. S. Steel Corp.'s Gunnison Homes, Inc., makers of prefabricated houses, will expand its production space by 100,000 sq. ft.

• *News of Industry* •

Doxsey Cites Product Mix Bugaboo for Warehouse Members

Cleveland—NPA order M-6 will have little influence on the volume of steel shipments to warehouses with two or three exceptions, according to Walter S. Doxsey, president of American Steel Warehouse Assn., Inc., in a report to ASWA members.

He pointed out that at the moment all DO and delegated tonnages may take but 15 pct of ingot capacity but the product mix is not uniform.

"The proportion of rated sheet and plate orders, for example, is far above the average," Mr. Doxsey added.

Minimum for Warehouses

"Another factor in the determination of steel tonnages to be shipped to warehouses is the latitude given each producer in the distribution of its free steel.

"Order M-6 states that the mills shall endeavor to ship unfilled orders from warehouses by the middle of February. This order establishes a minimum for shipments to warehouses; it sets no maximum. It further provides that mills shall recognize, and correct, if possible, abnormalities that occurred in shipments to warehouses during the base period."

He said the formula which relates the steel shipped to ware-

houses during the first nine months of 1950 to the free steel any mill has to offer is not of great significance. "It simply is a rough index to be used by producers in approaching the tonnages of steel to be allotted to their warehouse customers."

NPA expects warehouses in turn to cooperate by giving the defense department and industries having essential defense contracts first call on their stocks for warehouse-size quantities of scarce items, according to Mr. Doxsey.

Get Remaining Steel

"Order M-6 affords protection against exorbitant demands from these quarters. And it follows that in accordance with policies long observed by industrial steel warehouses that remaining items should be distributed equitably among civilian customers. Shipment of mill-size orders from warehouse stocks undoubtedly will incur disfavor with producers and bring additional and irksome regulations from NPA."

Canadian Steel Shipments Rise Sharply During August

Toronto — Canadian production of primary iron and steel shapes for the month of August 1950 totaled 365,125 net tons as compared with 346,040 tons in July and 279,403 tons in August 1949. Output for August included 354,031 tons of carbon steel shapes and 10,094 tons of alloy steel shapes. In the production figures for July are included 118,809 tons of shapes shipped to producers' own plants or plants within the industry for further processing.

Shipments for sale of primary iron and steel shapes in August amounted to 221,995 net tons, of which 211,669 tons were carbon steel shapes and 10,326 tons alloy steel shapes; in July shipments totaled 221,792 tons and included 212,675 tons of carbon and 9117 of alloy steel shapes and for August 1949 shipments amounted to 203,345 tons including 194,152 tons of carbon and 9193 tons of alloy

steel shapes. The above figures which show iron and steel shapes for sale do not include deliveries for further processing.

Producers' shipments of primary iron and steel shapes, subdivided according to principal consuming industries for the month of August, in net tons follow:

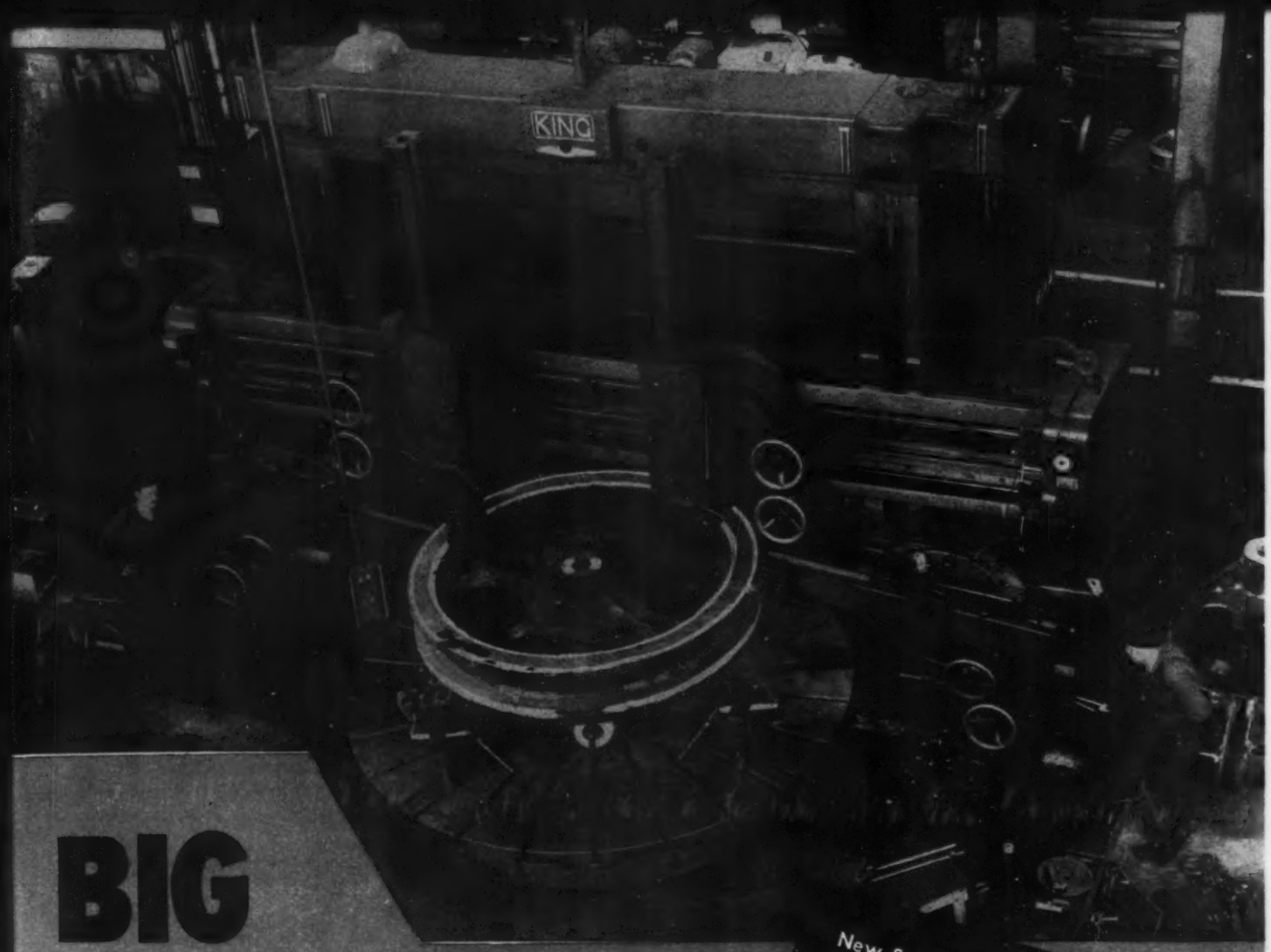
	Carbon Steel	Alloy Steel
Automotive	8,527	6,922
Agricultural	7,855	123
Construction	29,448	23
Containers	24,238	4
Machinery, tools	8,041	516
Merchant trade	28,397	335
Mining, lumbering	7,720	625
National defense	18	4
Pressing, stamping	13,679	141
Public works	887	33
Railway operating	32,990	147
Railway cars	4,645	86
Shipbuilding	927	23
Miscellaneous	1,009	126
Jobbers	26,584	129
Direct export		
(a) British Empire	440	26
(b) other countries	16,264	1,063
TOTAL SHIPMENTS.	211,669	10,326
Producers' interchange	118,515	294

The following table shows production and shipments for sale of primary iron and steel shapes for the month of August in net tons:

	CARBON STEEL	
	Made	Shipped
Billets, etc., for forging	11,087	3,721
Other semi-finished shapes, not for re-rolling by makers	42,120	13,285
Structural shapes and piling	7,428	8,043
Plates	11,200	10,499
Rails	26,057	20,480
Splice bars	1,465	1,516
Tie plates	5,281	5,234
Spikes	1,201	1,077
Reinforcing bars	10,157	7,952
Hot-rolled bars for cold finishing	1,843	.....
Other hot-rolled bars	42,136	28,989
Pipes and tubes	16,195	19,876
Wire rods	25,588	24,200
Hot-rolled black sheets	67,229	14,415
Cold reduced black sheets	15,674	12,803
Galvanized sheets	8,056	8,002
Steel castings	4,932	4,193
Miscellaneous hot-rolled products	31,054	3,266
All other products	25,328	24,118
TOTAL	354,031	211,669

Russian Hoist Diverted to France

Birmingham—Once destined for Russian coal mines, a 6-meter double drum electric mining hoist was diverted to the French Mining Commission, Rouens, France, by its builders, the Hardie-Tynes Mfg. Co., this city. The assembled hoist weighs over 1 million lb.



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Production Performance ... Profit Potential

WITH 4-HEAD NEW SERIES KING

New Series 144" KING turning the truck frame of a Bucyrus-Erie power shovel. All four heads are operating at once. The two swiveling side heads permit machining the tapered roller track with single point tools, at much higher speed than would be possible with a large form tool.

Here's another striking example of costs brought down . . . down . . . DOWN, with New Series KING Vertical Boring & Turning Machines. KING Mills save time, save money, improve quality, on the complete range of vertical boring and turning work—light or heavy, large or small. It will pay you to investigate KING cost-cutting advantages. Ten sizes—30" to 144"—the widest size range among general-purpose vertical boring mills.

WRITE FOR NEW CATALOGS!

New Illustrated KING Catalogs give full description of machines and detailed specifications. Catalog K-1 features Machines sizes 30", 36", and 42"; K-2, sizes 52", 62", and 72"; K-3, sizes 84" and 100"; K-4, sizes 120" and 144".

American Steel Foundries

KING MACHINE TOOL DIVISION

CINCINNATI 29, OHIO

Builders of King Vertical Boring & Turning Machines and Sebastian Lathes

• *News of Industry* •

Factory Vacuum Sales Spurt

Cleveland—During October, factory sales of standard size household vacuum cleaners totaled 331,445 units, an increase of 21.6 pct over October, 1949, and 1.2 pct over the previous month this year, according to C. G. Frantz, secretary-treasurer of the Vacuum Cleaners Mfrs. Assn.

For the first 10 months of this year sales came to 2,975,346 units, a gain of 25.7 pct over the corresponding period last year.

62 Diesels Ordered by L&N R.R.

Birmingham — Sixty-two Diesel locomotives will be purchased by Louisville & Nashville R.R. at a cost of $8,000,000, according to L & N president John E. Tilford. A total of $20,000,000 has been spent for Diesels since last August.

The Diesels will operate in the Southern States. Switching units will be assigned to Birmingham, Montgomery, Louisville, Nashville, New Orleans and the Selma-Myrtlewood district.

Asks Daring Handling Personnel

Pittsburgh—American management was urged to use the daring, initiative and imagination in meeting employee relations' problems it has used in developing better products by H. W. Anderson, GM vice-president in charge of personnel, at a meeting of the National Industrial Relations Conference. Less "shot-gun bargaining" and longer periods between negotiations was listed as areas in which GM has made progress.

Brazil Boosts Steel Output

Rio de Janeiro — Better ore transport and electric power facilities will enable Brazil to triple steel output in the next 5 years, says Sir John Duncanson, British steel production head during World War II. Brazil has already increased its steel production six times from about 120,000 tons per year in 1940 but must still import steel for its 1 million-ton-per-year needs.

Special Dividends Increase

Washington—A sharp increase in extra or special dividends during September boosted the third quarter total for corporations to nearly $1.9 billion, a third more than the $1.4 billion paid out during the quarter last year. Third quarter payments for the iron and steel industry totaled $104 million against $79 million last year.

Biggest increases were reported by automobile manufacturers who paid out $259 million in dividends for the quarter as compared with $90 million last year.

Drive for Freight Car Workers

Washington—State employment agencies have been assigned the task of finding enough workers to keep the government's freight car construction program rolling.

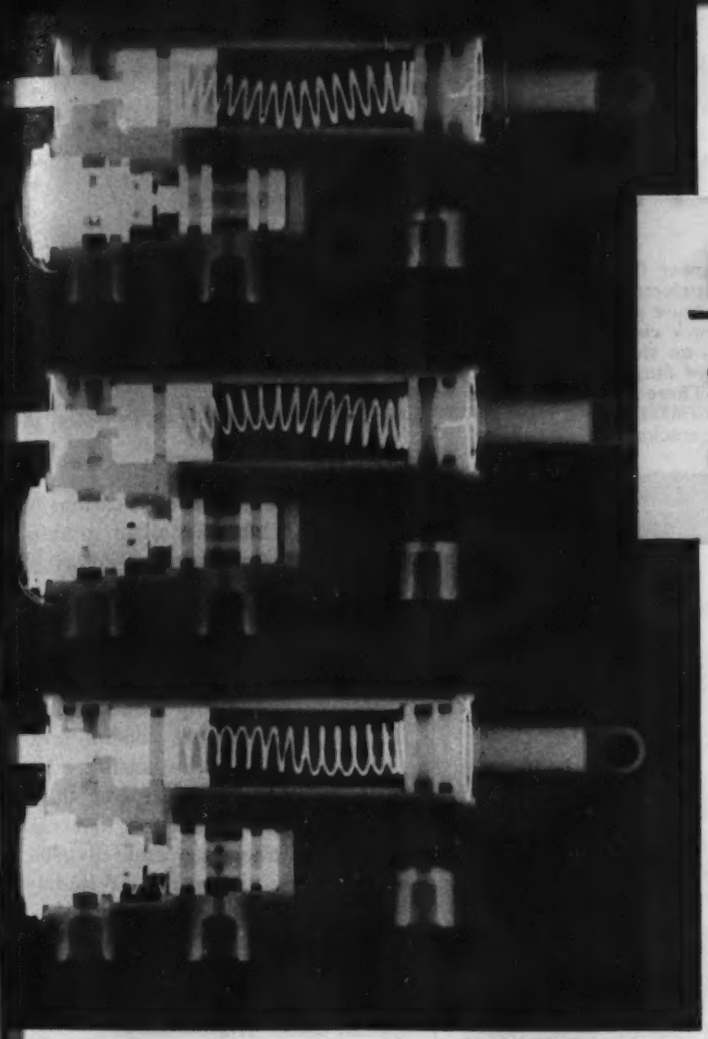
The Labor Dept. is telling the state agencies and the Railroad Retirement Board to recruit workers for the 10,000-car-per-month program and the car repair program being conducted by the railroads. Repair of 40,000 cars a month is planned by the Defense Transport Administration.

ECA Authorizes Purchases

Washington—Purchases of $500 million worth of tin, terne and blackplate by Sweden, $450 million worth of machine tools and $360 million in metalworking machinery by Austria, and $425 million in construction and mining machinery by Portugal have been approved by the Economic Cooperation Administration. Total purchase approvals by ECA amount to $10.4 billion to date.

New Metal Aids Communications

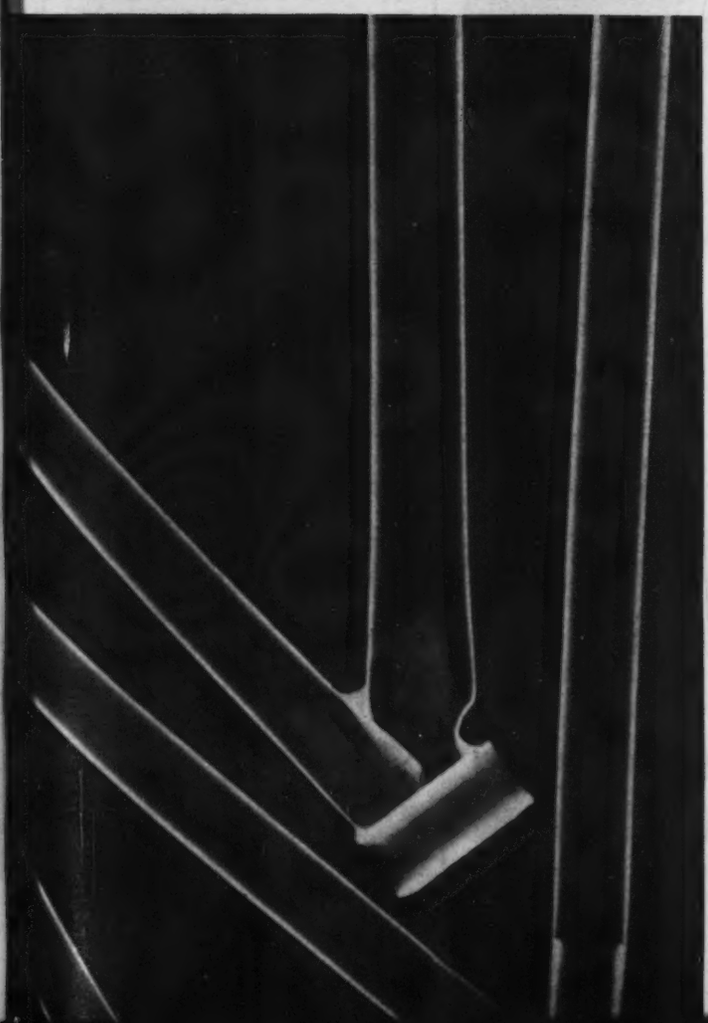
Pittsburgh—Improved performance of electronic communications equipment is declared possible with the use of a new sheet metal made of a magnetic base clad on each side with a nonferrous conductor, according to the American Cladmetals Co., manufacturer. The sheet is available in light and heavy gages.



RADIOGRAPHY
goes beyond inspection of castings and welds

CHECKS ASSEMBLIES

Two of a group of hydraulic cylinders failed to function. Disassembly would have taken too long and involved breaking seals. Radiography compared the two with a good cylinder and revealed not only the compression springs rubbing on cylinder walls but also the absence of a second coil spring in the valve assemblies.



EXAMINES ENCLOSED SURFACES

Even though treated and sealed, these landing gear struts of an amphibian plane can develop internal corrosion and become weakened. Radiography alone can provide an examination of these internal surfaces. So the manufacturer has made it routine in the periodic inspection for service and safety of its amphibians.

Your x-ray dealer will gladly discuss the many ways radiography can aid your business by increasing foundry yield, checking welds and doing many other important and valuable non-destructive inspections.

EASTMAN KODAK COMPANY
X-Ray Division, Rochester 4, N. Y.

Radiography . . .

another function of photography

Kodak
TRADE-MARK

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PUBLICATIONS

Continued from Page 34

can be produced including tapered and special internal bore shapes. *Tube Reducing Corp.*

For free copy insert No. 8 on postcard, p. 33.

Control System

Twelve suggested applications of the Hagan Ratio Totalizer in automatic control circuits are described and illustrated by diagrams in a new 8-p. bulletin. This pneumatically operated control mechanism accurately combines input control pressures and spring forces to produce a single output control pressure, as shown in the booklet. Applications described for computing circuits include addition, subtraction, multiplication and division, averaging, and reversal of loading pressure. A cutaway drawing illustrates the principles of operation and other drawings illustrate modifications of the basic design for special uses. *Hagan Corp.*

For free copy insert No. 9 on postcard, p. 33.

Seamless Alloy Tubing

A new technical data card lists the chemical compositions of B & W seamless alloy steel tubing, specifically B & W Croloy steels of the low and intermediate alloy groups. These apply to pipe for high-temperature service and tubing for use in heat exchangers, condensers, refinery stills, boilers and superheaters. Data covers chemistry according to ASTM specifications. *Babcock & Wilcox Tube Co.*

For free copy insert No. 10 on postcard, p. 33.

Purifier Selection

An 8-p. vapor purifier engineering manual contains convenient tables and formulas for easy selection of correct purifier sizes. The manual is designed for the convenience of engineers who must select the proper purifier equipment to solve entrainment problems in vapor, steam, gas, and air-applications. Information provided may be applied to both internal purifiers for drum, evaporator, receiver, and line units used in branch line appli-

FREE PUBLICATIONS

Continued

cations. Cutaway views show the centrifugal principle of Centrifix equipment, which approaches efficiencies of 100 pct. Applications are shown. *Centrifix Corp.*

For free copy insert No. 11 on postcard, p. 35.

Compacting Presses

Baldwin-Defiance compacting presses of 75-ton and 200-ton capacity for the plastic, ceramics and powder metal industries are covered in a new 4-p. bulletin. The bulletin gives features, specifications and illustrations of the two presses, which produce tablets up to 9 and 21 sq in. respectively. *Baldwin Locomotive Works.*

For free copy insert No. 12 on postcard, p. 35.

Surface Preparation

"Enamel Finishes Last Longer and Look Better on Wheelabrated Surfaces" is the name of a new 4-p. bulletin containing case studies of how the method improves appearance and adherence of enamel finish on stove plate, sanitary ware, etc., that will be of interest to enameling plants. *American Wheelabrator and Equipment Corp.*

For free copy insert No. 13 on postcard, p. 35.

Mechanical Recorders

The Streeter-Amet scientific and industrial recorder, for use wherever counting or timing data is needed, is described in a new 4-p. bulletin. The folder shows how variable components multiply recording possibilities of the unit and extend its use to an unlimited number of applications. Specifications for the two main types of counters are listed. *Streeter-Amet Co.*

For free copy insert No. 14 on postcard, p. 35.

Conveyers Shown

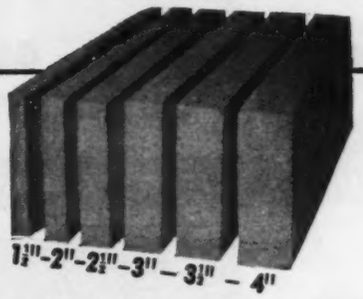
The line of Ultimate stationary medium duty horizontal and inclined belt and roller conveyers are described in a new 12-p. illustrated bulletin. Detailed descriptions of various units are presented, along with illustrations of a few of hundreds of installations covering a wide range of industry. Engineering drawings show general features of the units, and other drawings show typical layouts of conveyerized plants. *Island Equipment Corp.*

For free copy insert No. 15 on postcard, p. 35.

Resume Your Reading on Page 35

Why the lowest cost open hearth producers use SUPEREX for regenerator insulation

The large size of the Superex blocks saves construction costs



Superex blocks are furnished in various standard sizes and thicknesses

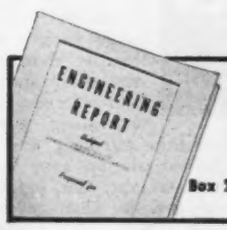
• "Insulate with Superex and you make substantial fuel savings and obtain higher operating temperatures," that's what cost-conscious operators find.

Superex provides these savings year after year. Made of calcined diatomaceous silica and asbestos, it presents a formidable heat barrier. It maintains its high insulating efficiency indefinitely on temperatures to 1900° F. . . . does not disintegrate . . . retains its high physical strength . . . resists the stresses of open hearth and other mill operations.

Higher operating temperatures with Superex result from its ability to reduce air infiltration. This advantage is traced to its unique structure and low permeability.

Superex is light in weight, easily cut and applied . . . comes in convenient standard sizes or may be ordered in irregular shapes.

To help you gain the greatest savings from Superex, Johns-Manville has prepared an engineering report, "Open Hearth Regenerators—a comparison of various insulation specifications." This report indicates the economic thickness of Superex to use as related to the costs of various types of fuels. To obtain this booklet, write Johns-Manville, Box 290, New York 16, N. Y.



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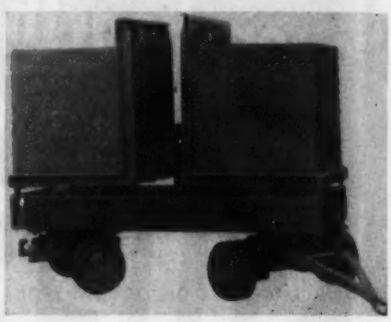
NEW

PRODUCTION IDEAS

Continued from Page 38

cally operated tilting racks, which can be tilted toward the center of the trailer eliminating danger of the oiled sheets slipping off during



transport. For unloading, the racks are raised to the normal position by hydraulic cylinder. Equipped with solid rubber-tired wheels, the trailer has a deck length of 7 ft 6 in., width of 36 in. and height of 24 in. *Phillips Mine & Mill Supply Co.*

For more data insert No. 31 on postcard, p. 31.

Portable Thickness Gage

For rapid checking of sheet and strip; reduces inspection costs.

Measurement is quickly and accurately transferred to a full-jeweled dial indicator, graduated 0.001 in., through the hardened

steel upper and lower contact points. The wide-faced, spring-loaded upper and lower anvils grip and hold the gage perpendicular to the stock surface. The gage is well balanced. The retraction lever is built into the handle in normal gripping position, the protecting lip at the front scoops and guides

Follow the lead of these Business Leaders...

they're all giving Schenley to wish friends the best!

Harry G. Griffiths, President of the Pennsylvania Drug Co., says: "I order Schenley by the case—and my gift buying is through! It's quick and easy! There's no finer whiskey-gift."

Col. William Schiff, President of Schiff Terhune & Co., Inc., Insurance Brokers, says: "I give Schenley because it's a really fine whiskey . . . and a really fine answer to my Christmas problems!"

Arthur Martin Karl, President of Names Unlimited, Inc., Direct Mail Consultants, says: "Schenley is the answer to all my gift problems. I enjoy Schenley in my home, too."

Herbert Sondheim, President of Herbert Sondheim, Inc., Famous Dress Manufacturers, says: "Everyone appreciated Schenley last year, so I'm giving it again this Christmas."

Richard E. Booth, Executive of Nowland & Schladermundt, Industrial Designers, says: "A gift of Schenley is the best way I know to say, 'Thanks for all you've done for me this past year!'"

Edward Lyman Bill, President of Bill Bros. Publishing Co., Publishers of Sales Management, says: "Schenley is an ideal gift. Every man welcomes a gift of fine whiskey."

It's "GOOD BUSINESS" to give

SCHENLEY

SCHENLEY

BLENDED WHISKEY 86 PROOF. 65% GRAIN NEUTRAL SPIRITS. SCHENLEY DISTRIBUTORS, INC., N. Y. C.

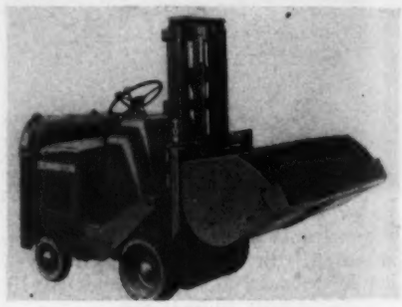
the stock into the gage. The indicator may be furnished with direct or continuous reading dial. For sorting purposes a direct reading dial is preferred. *Federal Products Corp.*

For more data insert No. 32 on postcard, p. 35.

Hydraulic Scoop

Lift truck accessory picks up, transports, dumps bulk material.

Actuated by a powerful, two-way hydraulic cylinder, the accessory offers positive, finger-tip control of the angle of the scoop. With the



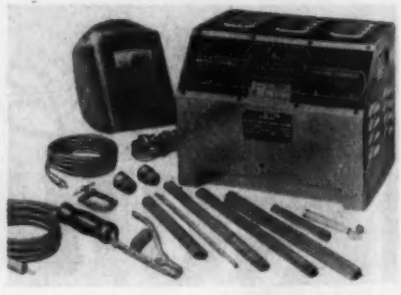
lift truck's mast in vertical position, the scoop will tip 45° forward for dumping and 30° backward for carrying the load. It can be dumped from carrying position in approximately 3 sec on the Model Lt-35 Towmotor. The only variable dimension on scoops of different capacities is the overall width. The scoop is readily interchangeable with standard pallet forks. *Towmotor Corp.*

For more data insert No. 33 on postcard, p. 35.

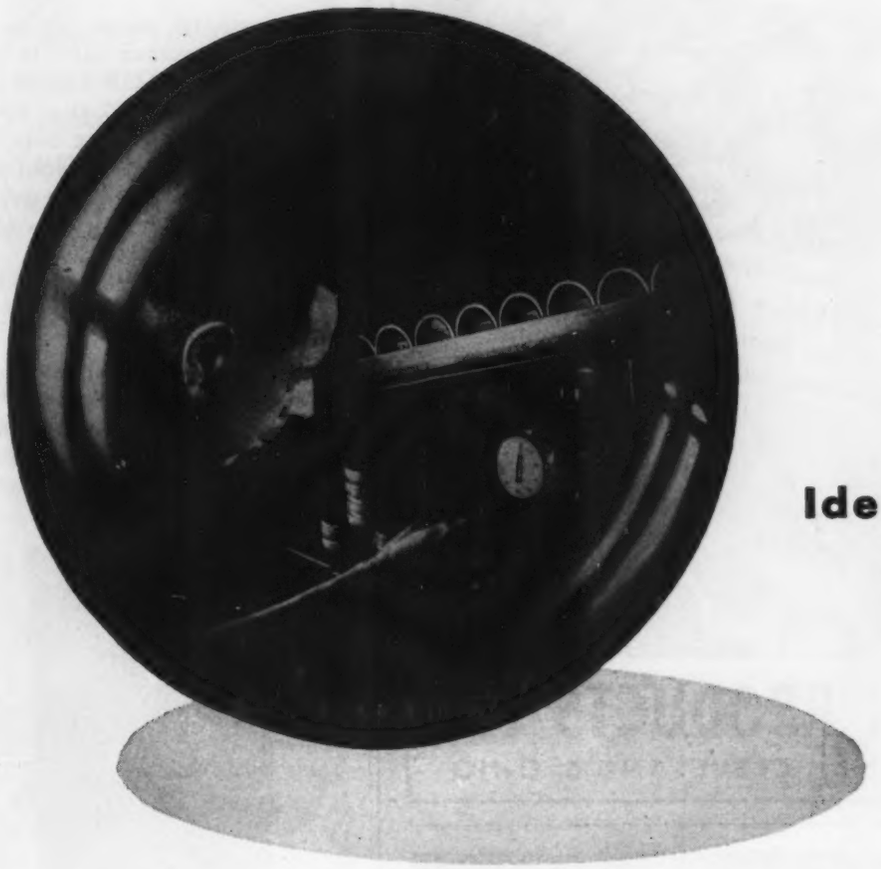
Portable Arc Welder

For on-the-spot welding of light and heavy gage metals.

Engineering features of the new welder include improved method of



cooling, sloping control panel for ease of operation, simplified terminal control and greater ease of striking arc. Operating features are



Identical Twins

PARALLELISM in a ball bearing is one of its most vital dimensions. In Federal Ball Bearings it's a mechanical certainty because Federal equipment grinds *both sides* of an outer race *at the same time.* And sensitive gauges on all machines control this accurate dimension which is maintained throughout production.

Will Federal Bearings take the heavier loads? Crush tests of through-hardened balls and race rings see to that. Fatigue tests under pre-determined thrust and radial loads further guard against failure.

Are Federals quiet? They have to be to pass running tests in Federal's soundproof "listening posts." After all dimensions and tolerances are checked, *every* bearing is tested for quiet operation.

So it goes, all along the Federal manufacturing and inspection cycle . . . *over 100 individual production inspection and cleaning operations go into every Federal Bearing* —with *every fourth operator an inspector.*

It's Federal's way of making *sure* that a bearing is neither too tight nor too loose, that the ball track is ground to a chatter-free finish and just the right radius, bores are cylindrical, not tapered or bell-mouthed and the sides of the rings are parallel to each other and the ball track.

In your equipment it means higher speeds, heavier load capacity, power saving and over-all friction-free performance.

Our 260-page catalog "K" describes the complete Federal Ball Bearing line. Write for it today. Also write for a copy of our latest Ball Bearing Conversion Tables which contain complete up-to-date interchange information.

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Quality since 1908

FEDERAL BALL BEARINGS

ONE OF AMERICA'S LEADING BALL BEARING MANUFACTURERS

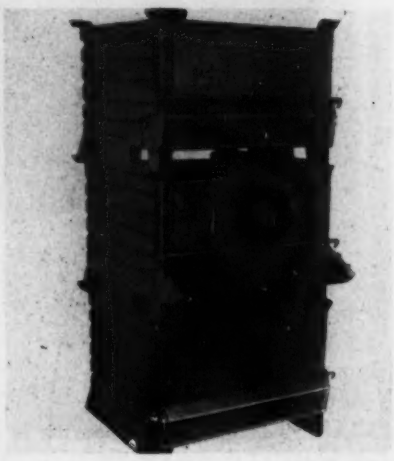
positive control, staple arc, no arc blow and no moving parts to wear out. The Model 125A has 16 heat stages from 20 to 125 amp. It uses 1/16 to 5/32-in. welding rods. The welder is furnished equipped with headshield, electrode holder, ground clamp, cables, and assorted welding rods. *Trindle Products, Ltd.*

For more data insert No. 34 on postcard, p. 35.

Hopper Box

Hopper door drops work at level convenient for machine operator.

A new hopper box, designed to eliminate need for auxiliary stand or frame support, is constructed in



sizes, gages and types to suit the job application. The box easily tiers, and is available in gravity feed or flat bottom styles, with two-way or four-way lift truck entry and different door styles. *Powell Pressed Steel Co.*

For more data insert No. 35 on postcard, p. 35.

Space-Heating Mat

Localizes warming of chilly areas.

Combining the features of a wire-coil doormat with a large-area electric element, the Dura-Thermal mat offers an inexpensive solution to loss of efficiency among uncomfortable workers. Coils of hard steel wire are wound over a 280 w, 120 v metal-encased element, distributed over the 16x27-in. mat area in a pattern assuring even, overall heating. The whole is enclosed in a heavy frame with protective rails of tubular burnished aluminum. The mat is effective in vertical wall, free-hanging applications, or for

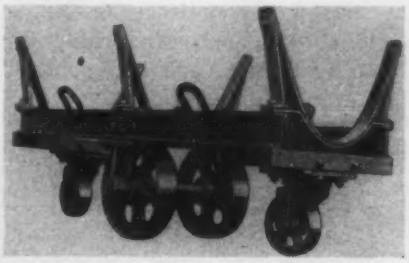
under-foot applications. The heated element is held away from the floor and will not discolor painted surfaces. *Walter B. Snook Enterprises.*

For more data insert No. 36 on postcard, p. 35.

Bar Iron Truck

Handles long lengths of angles, pipe, tubing, screw machine stock.

Ruggedness is the keynote of the truck's construction. The frame is made of 4-in. structural steel channel bolted to heavy angles.



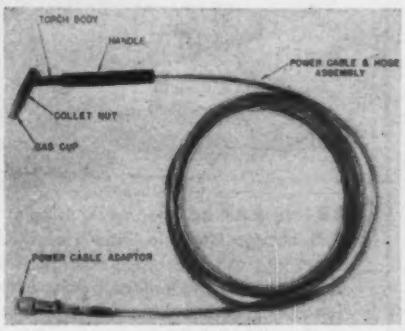
Hoisting eyes are riveted to the frame for use with overhead handling systems. Formed, steel saddles keep the bar stock on the center of the truck, providing a stable load that can not fall off. Three types of wheels are available: high grade gray iron, phenolic resin plastic and molded on industrial rubber tires, all equipped with Hyatt roller bearings. *Lansing Co.*

For more data insert No. 37 on postcard, p. 35.

Heliarc Torch

For welding thin-gage materials; has a two-position welding head.

A new, lightweight, air cooled Heliarc torch for inert gas-shielded arc welding has a two-position



welding head and needs no water cooling. Maximum current capacity for continuous duty is 75 amp. Torch head and handle assembly weigh only 3 oz. Two torch caps permit use of 3 or 7-in. electrodes. The entire torch body is sheathed in nylon plastic, safeguarding the operator from electrical shock. Steel collets are avail-

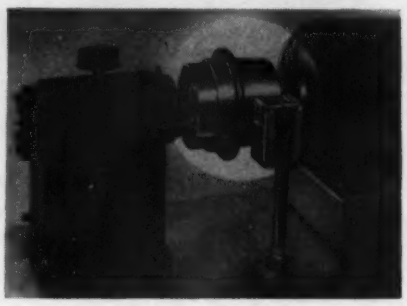
able for 0.020, 0.040, and 1/16 in. diam electrodes. The torch can be used with either straight-polarity dc or high frequency stabilized ac. *Linde Air Products Co.*

For more data insert No. 38 on postcard, p. 35.

Cut-Out Coupling

Shuts off power when overloaded and resets itself automatically.

A new automatic device for machine tools, processing equipment, conveyers, etc., instantly shuts off



the power when an overload due to any cause occurs and resets itself automatically, preventing sheared pins, saving the time normally required to replace them. The coupling combines the features of a flexible coupling with the torque sensitive protection of the cutout pulley. Two sizes are available with working ranges from 20 to 10,000 in.-lb torque. *Anchor Steel & Conveyer Co.*

For more data insert No. 39 on postcard, p. 35.

Dehumidifier

Maximum 24-hr capacity of 50 lb of water removal from the air.

Due to basic improvements in design the dehumidifier 50 will remove 1 gal of water from the air in storerooms or other closed spaces in from 4 to 5 hr, under average temperature and relative humidity conditions. Larger installations are capable of dehumidifying larger warehouses and all models are available with or without heat recovery means. Automatic means of disposing of the condensate removed from the air are optional. *Walter Haertel Co.*

For more data insert No. 40 on postcard, p. 35.

Resume Your Reading on Page 39

Since the inception of die casting the automotive industry has been, by far, the largest user of zinc alloy die castings. This is not surprising as ease of casting and finishing, as well as the physical characteristics of zinc base alloys, provides the ideal metal for automotive hardware and a great variety of functional parts.

ZINC ALLOY DIE CASTINGS

Percent of 1949 Sales by End Uses
(Based on Estimates of AMERICAN DIE CASTING INSTITUTE covering Jobbing Die Casters only)

INDUSTRY & PRODUCT	% POUNDS SHIPPED
Transportation—Motor Vehicles	54.4
Household Appliances, Furnishings, Equipment	22.4
Mining, Construction, Agricultural Machinery, Commercial Machines & Equipment	8.4
Plumbing, Heating & Builders Hardware	5.4
Office Machines, Photographic, Optical & Scientific Instruments & Equipment	3.7
Communication Equipment, Electronic & Timing Devices, Clocks, Vending Machines, etc.	3.3
Sporting Goods, Jewelry, Toys, etc.	2.4

Other industries have found similar advantages in the adoption of zinc die casting for their respective products. This is evidenced by the fact that nearly 75% of all die castings by weight are based on zinc.

- **DIE CASTING is the Process**
- **ZINC, the Metal**
- **BUNKER HILL, the Preferred Zinc**

BUNKER HILL 99.99+% ZINC

EASTERN SALES AGENTS ST. JOSEPH LEAD COMPANY 250 PARK AVENUE, NEW YORK 17
SALES OFFICE FOR PACIFIC COAST NORTHWEST LEAD COMPANY SEATTLE, WASHINGTON

Output of Canadian Mines Valued at $1 Billion for 1950

New York—Output of Canadian mines in 1950 will be valued at over $1 billion, surpassing by $100 million the record set in 1949, reports *The Northern Miner*. In the most rapidly climbing group were copper, nickel, lead and zinc. Stimulus to production was higher prices and greater demands of accelerated industry.

In the postwar period, Canada has built up its industry and has transformed itself from chiefly a supplier of raw materials to both a user and supplier. It consumed six times more aluminum this year than in 1938, twice as much copper and lead, and three times more nickel, zinc and silver.

Nelson Stud Sales Spurt 50 Pct

Toledo, Ohio — Expanding war needs that spurred sales of the Nelson Stud Welding Div. of Morton Gregory Corp. by 50 pct in the 6 months ended Oct. 31 has motivated the firm's directors to approve a 50 pct increase in manufacturing space at the Nelson plant here.

George E. Gregory, president, estimates that stud sales to basic industries not involved in the material conservation program will be 60 to 70 pct during the next 6 months over the same period in 1949. Nelson also intends establishing a San Francisco warehouse.

Sintercast Corp. Moves to Yonkers

Yonkers, N. Y.—Larger quarters for its laboratory and production facilities in this city have been acquired by the Sintercast Corp. of America. Formerly a research and development organization, Sintercast entered the production end with the purchase of Wright Carbide Co., East Orange, N. J.

Activities of the firm now include: research into and development of new powder metallurgy techniques and alloys and production of standard and specialized powder metal parts.

MARKET

Briefs and Bulletins

tool steel prices—Crucible Steel Co. has announced a 10 pct increase in prices of tool steel and high speed steel effective Dec. 2. New prices per lb are: High-carbon-chromium, .635¢; oil hardened maganese, .35¢; special carbon, .325¢; extra carbon, .275¢; regular carbon, .23¢. Prices for other grades are: W-18, Cr-4, V-1, Mo-0, Co-0, $1.10; W-18, Cr-4, V-1, Mo-0, Co-5, $1.72; W-18, Cr-4, V-2, Mo-0, Co-0, $1.245; W-1.5, Cr-4, V-1.5, Mo-8, Co-0, .785¢; W-6, Cr-4, Mo-6, Co-0, 84¢.

pig iron prices—Several major producers announced increases in pig iron prices. Youngstown Sheet & Tube at Youngstown and Hubbard, O., announced a $3 per ton increase on malleable. A $3 increase for basic, No. 2 foundry, malleable, bessemer and low phos was announced by: Bethlehem Steel Co. at Bethlehem and Steelton, Pa.; Republic Steel Corp. at Birmingham, Buffalo, Troy, and Cleveland; Lone Star Steel Co. at Daingerfield, Texas; Shenango Furnace Co. at Sharpsville, Pa.; Pittsburgh Coke & Chemical Co., at Neville Island; Interlake Iron Corp.; and Hanna Furnace Co.

iron ore increase—Cleveland-Cliffs Iron Co. has announced a 60¢ a ton increase in the price of standard grades of iron ore of 51.5 pct natural iron content delivered at rail or vessel at lower Lake ports. New prices are: Mesabi range, nonbessemer, $8.30; Mesabi range bessemer, $8.45; old range nonbessemer, $8.55; old range bessemer, $8.70.

electrical sheets—U.S. Steel has announced a price increase of $11 per ton for electrical sheets, cut lengths, 22 gage price base. The increase applies to armature, electrical, motor, dynamo and transformer grades 72, 65, 58 and 52.

molybdic oxide prices—Climax Molybdenum Co. has raised prices 10¢ a lb effective Dec. 1. Bagged molybdic oxide is $1.13 per pound of Mo contained; briquettes and canned molybdic oxide, $1.14; calcium molybdate, $1.15; ferromolybdenum, $1.32.

Armco wage, price rise — Armco Steel Corp. has announced an average hourly wage increase of 18½¢, ranging from 13¢ to 33¢. Armco at the same time announced an increase in steel prices of from $5 to $11 a ton, effective Dec. 1.

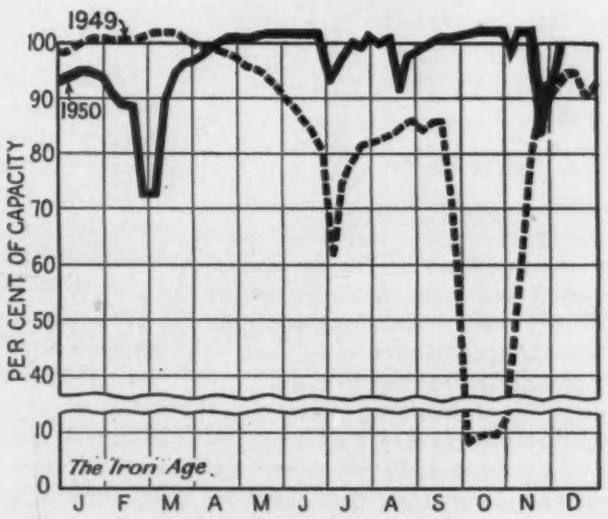
backlogs—When the railroads started ordering great quantities of cars last July and August, some car builders took on during a short period more than they could produce in a full year. Order backlogs of some builders are now reaching into 1952.

inventories—All-out auto production during September and October took its toll of steel inventories. Output has now fallen from 194,000 per week in October to less than 120,000. Yet steel remains very tight.

increase in sheets — Great Lakes Steel Corp. has raised prices of hot-rolled and cold-rolled sheets $5 per ton. Other price changes are expected later.

Sharon prices — Sharon Steel Corp. has announced the following new prices: h-r strip and sheets, 4.00¢ per lb; c-r strip, 5.35; carbon steel plates, 3.95; h-r alloy strip, 5.85; c-r alloy strip, 10.60; alloy steel plate, 5.20; low alloy high strength h-r strip, 5.40; stainless c-r strip (all grades), 2¢ per lb higher.

Steel Operations**



District Operating Rates—Per Cent of Capacity**

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Nov. 26	97.0*	104.0	42.0	96.0	102.0*	104.0	63.0*	103.0	60.0*	106.0	91.0*	90.5	113.0	82.0*
Dec. 3	99.0	104.0	90.0	98.0	104.5	104.0	100.0	106.0	101.0	106.0	95.0	90.5	100.5	100.5

* Revised.
** Steel operations for the first half of 1950 are based on annual capacity of 99,392,600 net tons. Beginning July 1, 1950, operations are based on new annual capacity of 103,563,500 net tons.

Nonferrous Metals OUTLOOK

Market Activities

NPA issues orders covering nickel and zinc; cut back 35 pct and 20 pct, respectively . . . Dealers' copper scrap prices drop 5¢, brass drops 2½¢ per lb.

New York—National Production Authority orders are being issued with increasing frequency. Early last week, NPA issued orders M-10 on cobalt and M-11 and M-12 on copper, as well as amending M-7. (See page 144.) On Saturday, NPA told producers what they could do with nickel (order M-14) and zinc (order M-15).

Non-defense use of primary nickel for first quarter 1951 is cut back to 65 pct of the quarterly average aof the first half of 1950. The order applies to electrolytic nickel, ingots, pig, rolled and cast anodes, shot, oxides and residues derived directly from nickel. Those who consume less than 250 lb per quarter are exempt and use for maintenance, repair and operating supplies is allowed at 100 pct of the base.

Nickel inventories are limited to a 30-day supply or a practical working minimum, whichever is less.

Zinc Cut to 80 Pct

M-15 limits first quarter zinc consumption for non-defense purposes to 80 pct of the same base period and inventories are set at 45 days or a practical working minimum, whichever is less.

This order applies to metal produced by electrolytic, electro-thermic, or fire refining processes, including scrap and other secondary metal, and any alloy containing 50 pct or more of zinc by weight. Zinc products specified in the order include sheet, strip or ribbon, rod, wire, castings, plates and shapes either drawn or extruded.

Two specific exemptions are provided in order M-15: (1) Users of less than 3000 lb per quarter and (2) highly specialized uses as well as when zinc is substituted for cadmium in electroplating. Maintenance and repair use are permitted at 100 pct of the base period.

Dealers' buying prices for copper and brass scrap took a nose dive early this week. The latest quotation for No. 1 heavy copper and wire is 19½¢ to 20¢ per lb, off 5¢; other copper scrap is off proportionately. Brass prices fell 2½¢ per lb. New price for No. 1 composition is 16¼¢ to 16½¢ per lb, with other brass prices also down by the same amount.

Refinery Prices Also Down

Custom smelters and ingot makers have also reduced their buying prices for copper and brass. They will now pay 21¢ per lb for No. 1 copper, 20¢ for No. 2 and 19¢ for light copper. Brass buying prices are down 2½¢ per lb on all grades.

The reason for decrease in these prices was the fact that NPA order M-12 specifically included scrap metal in cutting down nonessential civilian use of copper and another order is expected which will practically eliminate copper conversion as of Jan. 1. Prices did not drop quite as soon as expected because there were still outstanding orders which the dealers had to fill.

While some of the demand for copper and brass will have to go unfilled, the relationship of prices for primary metal and scrap is once again on a fairly normal basis.

General Picture Unclear

Early in the week there were practically no sales because the general picture was not clear.

Secondary brass and bronze ingots have not yet followed scrap prices but they are expected to drop soon since these prices are closely tied to the prices of scrap metals.

MONTHLY AVERAGE PRICES

The average prices of the major nonferrous metals in November based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	24.50
Lake copper, delivered	24.625
Straits tin, New York	81.373
Zinc, East St. Louis	17.50
Zinc, New York	18.22
Lead, St. Louis	16.80
Lead, New York	17.00

NONFERROUS METALS PRICES

	Nov. 29	Nov. 30	Dec. 1	Dec. 2	Dec. 4	Dec.
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake, delivered	24.625	24.625	24.625	24.625	24.625	24.62
Tin, Straits, New York	$1.45	$1.39	$1.36	....	$1.39	$1.40
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	16.80	16.80	16.80	16.80	16.80	16.80

Note: Quotations are going prices.

*Tentative.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.3¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate: ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-T5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.142; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.024 in. x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb; 0.024 in. x 28 in., 26.9¢ per lb.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O. ⅛ in. 63¢; 3/16 in. 65¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 67.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base: Up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅝, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ⅞, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	69	53
Strip, cold-rolled	75	56
Rods and bars	65	51
Angles, hot-rolled	65	51
Plates	67	52
Seamless tubes	98	86
Shot and blocks	..	46

Copper, Brass, Bronze

(Freight prepaid on 200 lb includes duty)

	Sheets	Rods	Extruded Shapes
Copper	41.03	....	40.63
Copper, h-r	....	36.88	....
Copper, drawn	....	38.18	....
Low brass	39.15	38.84	....
Yellow brass	38.38	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.08	38.61	38.07
Leaded brass	....	32.63	36.70
Com'l bronze	41.13	40.82	....
Mang. bronze	45.96	40.65	41.41
Phos. bronze	60.20	60.45	....
Muntz metal	40.43	36.74	37.99
Ni silver, 10 pct	49.27	51.49	....
Arch. bronze	....	....	35.11

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	32.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$300
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask f.o.b New York	$106 to $122.50
Nickel, electro, f.o.b. New York	51.22
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	44.25
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	80.00
Tin, New York	$1.40
Titanium, sponge	$5.00
Zinc, East St. Louis	17.50
Zinc, New York	18.22
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	47.50
No. 215	44.50
No. 245	37.00
Yellow ingot	
No. 405	25.50
Manganese bronze	
No. 421	32.75

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	33.75-34.25
0.60 copper, max.	33.50-34.00
Piston alloys (No. 122 type)	31.50-32.00
No. 12 alum. (No. 2 grade)	30.75-31.25
108 alloy	31.25-31.75
195 alloy	32.75-33.25
13 alloy	34.00-34.50
AXS-679	31.25-31.75

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	32.50-33.00
Grade 2—92-95%	30.75-31.50
Grade 3—90-92%	30.00-30.50
Grade 4—85-90%	29.50-30.00

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39⅛
Electrodeposited	33⅜
Rolled, oval, straight, delivered	38⅞
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	35½
Nickel 99 pct plus	
Cast	68.00
Rolled, depolarized	69.00
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	52.15
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	61¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drums	45.85

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	23	22¼
Yellow brass	20⅛	18¾
Red brass	21⅛	20¾
Comm. bronze	21¾	21
Mang. bronze	19½	18⅝
Brass rod ends	19⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	21.00
No. 2 copper wire	20.00
Light copper	19.00
Refinery brass	18.50*
Radiators	15.00

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	21.00
No. 2 copper wire	20.00
Light copper	19.00
No. 1 composition	20.00
No. 1 comp. turnings	19.75
Rolled brass	16.50
Brass pipe	18.50
Radiators	15.25
Heavy yellow brass	15.00
Aluminum	
Mixed old cast	20
Mixed old clips	21
Mixed turnings, dry	19⅛
Pots and pans	20
Low copper	22⅛

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	19½—20
No. 2 heavy copper and wire	18 —18½
Light copper	17 —17¼
New type shell cuttings	17 —17¼
Auto radiators (unsweated)	12¾—13
No. 1 composition	16¼—16½
No. 1 composition turnings	15¾—16
Clean red car boxes	14¼—14½
Cocks and faucets	14¼—14½
Mixed heavy yellow brass	11 —11½
Old rolled brass	12½—13
Brass pipe	15¼—15½
New soft brass clippings	16 —16½
Brass rod ends	15 —15½
No. 1 brass rod turnings	14½—15
Aluminum	
Alum. pistons and struts	12½—13
Aluminum crankcases	15½—16
2S aluminum clippings	19 —19⅛
Old sheet and utensils	15½—16
Borings and turnings	13
Misc. cast aluminum	15½—16
Dural clips (24S)	15½—16
Zinc	
New zinc clippings	14½—15
Old zinc	11 —11¼
Zinc routings	8½— 9
Old die cast scrap	8 — 8¼
Nickel and Monel	
Pure nickel clippings	60 —65
Clean nickel turnings	57 —60
Nickel anodes	60 —65
Nickel rod ends	60 —65
New Monel Clippings	22 —25
Clean Monel turnings	18 —20
Old sheet Monel	20 —22
Inconel clippings	26 —28
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13
Lead	
Soft scrap, lead	14¼—14¾
Battery plates (dry)	8¾— 9
Magnesium	
Segregated solids	9 —10
Castings	5½— 6½
Miscellaneous	
Block tin	85 —90
No. 1 pewter	63 —65
No. 1 auto babbitt	58 —60
Mixed common babbitt	12¼—12½
Solder joints	18½—19
Siphon tops	58 —60
Small foundry type	16¼—16½
Monotype	14¾—15
Lino. and stereotype	14½—14¾
Electrotype	12¾—13
Hand picked type shells	11½—11¾
Lino. and stereo. dross	8 — 8¼
Electro. dross	6½— 6¾

MARKETS—PRICES—TRENDS

SCRAP
Iron & Steel

Trade Awaits Scrap Formula Lid To Lift

Scrap centers were watching and waiting for the lid to lift on the heavy melting grades scrap formula. They were certain that enough steam had developed in the markets to force the formula up—and they also had recent steel price increases as arguments. Guesses ranged from a jump of $2.50 a ton on No. 1 to $5.00. At press time a formula change was still uncertain but on the verge of changing.

Since the guessing followed steel price increase announcements, proponents of the $2.50 estimate pointed out that they had applied the 5½ pct boost in steel prices to get their conclusion. Others contended that $2.50 was not enough to bring out the scrap—and a third group said that even if the price was raised as high as $5 only a small percentage of scrap would be freed.

The latter maintained that only so much scrap was available—whatever the price—and that current prices were high enough to drag out nearly all of it. (In some form or other.) The market at press time had one paramount quality—uncertainty.

PITTSBURGH—Main topic of discussion this week is the expected increase in the formula prices for No. 1 heavy melting and other melting grades. Reasoning in the trade is that scrap formula prices will go up about in proportion to the increase in finished steel prices. Early in the week, however, the mills were sticking to the existing formula, although upgrading was quite general. Low phos plate was up $1. Heavy turnings were 50 cents stronger. No. 1 machinery cast was up $2 to $63, while mixed yard cast moved up $1.50.

CHICAGO—At press time members of the scrap trade in the Chicago area were waiting for a new price on openhearth grades expected to be announced by a leading consumer this week. Sources in the trade estimate that the new prices will be $5 to $6 per gross ton over the last mill prices. High prices being paid in other districts is causing some scrap to be shipped out of the area. Short shoveling turnings and cast iron borings are quotable at $37.50 per gross ton. Cast and railroad items are stronger with some increases noted.

PHILADELPHIA—Following raiding of this market and the almost certain increase in formula prices, dealers and brokers were holding back their scrap waiting to see what would happen later this week. The market is quiet but confused. Bad weather and the coming Christmas holiday will further reduce the amount of material that is coming out. There is some apprehension in the trade since nonferrous scrap prices dropped from 5¢ to 7¢ per lb here.

NEW YORK—The scrap trade was watching and waiting for the results of the meeting which was to have been held here last Tuesday morning. It was expected the formula was to be lifted in the wake of steel price increases. Guesses ranged up to $5. Reportedly, scrap from this section was being raided by outside-the-area mills. No. 2 bundles and machine shop turnings advanced. Prices were otherwise stronger pending results of the Tuesday meeting.

DETROIT—The Detroit scrap market is still very strong. Uncertainty prevails at every market level from industrial plant to steel mill. Reports of a possible upward revision in the formula have been circulating. A report that a steel mill has refused to roll ingots where scrap was bought at prices over formula has been heard. There is evidence that all steel mills, particularly electric furnace producers, are eating up inventories. Replacement material is not obtainable in a free market at formula prices. The practice of earmarking scrap is continuing so that today probably less than 10 pct of Detroit scrap is moving outside of directives as to price and mill destination.

CLEVELAND—With the trade sensing an upward revision in formula prices, a strong market here and in the Valley was watchfully waiting at press time. Most persistent rumor has it that a $2.50 a ton increase is in the making. Mills have comparatively small tonnages on the books and brokers are hoping to get the increase on their present orders. Two major railroad lists are closing this week, which is expected to stimulate foundry grades to a new high.

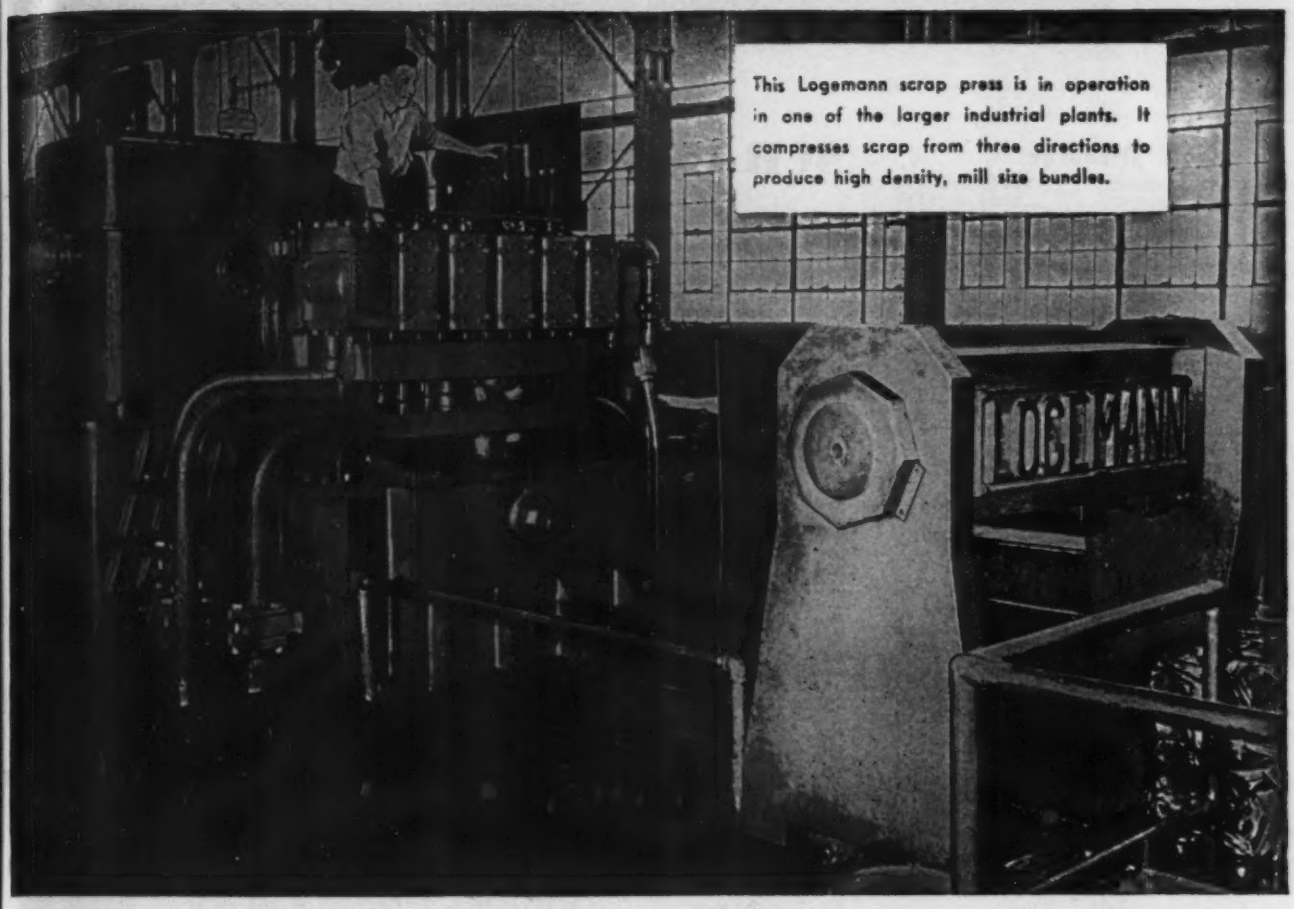
ST. LOUIS—The formula for No. 2 heavy melting steel, which had been in effect for nearly 2 months, has been broken, as a leading district melter came into the market for sizable tonnage. Outside buying also was a factor in the advance of $1 a ton. Foundry grades are strong and higher based on a scarcity of material and improved business by consumers.

CINCINNATI—Prices were in flux in a turbulent market here. Undertone of the market is very strong and anticipating an upward revision of formula prices. Brokers are not taking new orders and dealers are waiting. The market needs a stabilizing move and the rumored $2.50 per ton upward revision might provide a new and firmer basis for trading. Foundry grades are running wild.

BOSTON—Scattered sales of up to $37 a ton for No. 1 steel, comprising about 20 pct of trading, was reported here. No. 2 heavy prices were slightly over the formula. No. 1 and No. 2 bundles notched a $1 gain each. Items in the turning and cast groups also scored gains of 50¢ and $1.

BIRMINGHAM — The area's largest scrap buyer went into the market this week and prices on nearly every category advanced $2. This heavy buying will bring on another scarcity, brokers say, although some scrap moved into the district last week during the month-end lull in buying.

BUFFALO — Cast prices advanced an additional $2. A strong tone prevailed as one of the top consumers of cast was able to obtain only limited tonnage at the higher levels. Cupola reached $51 to $52 while No. 1 machinery moved to $54 to $55. Sales were reported in both items. Sales are reported to smaller buyers at prices exceeding formula levels.



This Logemann scrap press is in operation in one of the larger industrial plants. It compresses scrap from three directions to produce high density, mill size bundles.

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Iron and Steel

SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$43.50 to $44.00
No. 2 hvy. melting	40.50 to 41.00
No. 1 bundles	46.00 to 46.50
No. 2 bundles	38.50 to 39.00
Machine shop turn.	35.50 to 36.00
Mixed bor. and ms. turns.	35.50 to 36.00
Shoveling turnings	37.50 to 38.00
Cast iron borings	37.00 to 37.50
Low phos. plate	54.50 to 55.00
Heavy turnings	46.50 to 47.00
No. 1 RR. hvy. melting	44.00 to 45.00
Scrap rails, random lgth.	63.00 to 63.50
Rails 2 ft and under	67.00 to 68.00
RR. steel wheels	61.00 to 62.00
RR. spring steel	61.00 to 62.00
RR. couplers and knuckles	61.00 to 62.00
No. 1 machinery cast	62.50 to 63.00
Mixed yard cast.	55.50 to 56.00
Heavy breakable cast	51.50 to 52.00
Malleable	68.00 to 70.00

Chicago

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	37.50 to 38.00
No. 1 factory bundles	39.50 to 40.00
No. 1 dealers' bundles	39.50 to 40.00
No. 2 dealers' bundles	34.00 to 35.00
Machine shop turn.	34.50 to 35.00
Mixed bor. and turn.	34.50 to 35.00
Shoveling turnings	36.50 to 37.50
Cast iron borings	36.50 to 37.50
Low phos. forge crops	55.00 to 57.00
Low phos. plate	52.00 to 54.00
No. 1 RR. hvy. melting	46.50 to 47.50
Scrap rails, random lgth.	60.00 to 61.00
Rerolling rails	63.00 to 66.00
Rails 2 ft and under	67.00 to 68.00
Locomotive tires, cut	58.00 to 59.00
Cut bolsters & side frames	54.00 to 55.00
Angles and splice bars	63.00 to 64.00
RR. steel car axles	100.00 to 105.00
RR. couplers and knuckles	58.00 to 59.00
No. 1 machinery cast.	62.00 to 64.00
No. 1 agricul. cast.	56.00 to 57.00
Heavy breakable cast.	52.00 to 53.00
RR. grate bars	48.00 to 49.00
Cast iron brake shoes	51.00 to 52.00
Cast iron car wheels	58.00 to 59.00
Malleable	72.00 to 75.00

Philadelphia

No. 1 hvy. melting	$38.50 to $39.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	38.50 to 39.00
No. 2 bundles	31.00 to 32.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	36.00 to 37.00
Shoveling turnings	32.00 to 33.00
Low phos. punchings, plate	49.00 to 50.00
Low phos. 5 ft and under	48.00 to 49.00
Low phos. bundles	45.00 to 46.00
Hvy. axle forge turn.	38.50 to 39.00
Clean cast chem. borings	41.00 to 42.00
RR. steel wheels	53.00 to 54.00
RR. spring steel	53.00 to 54.00
Rails 18 in. and under	66.00 to 67.00
No. 1 machinery cast.	56.00 to 57.00
Mixed yard cast.	49.00 to 51.00
Heavy breakable cast.	49.00 to 50.00
Cast iron carwheels	62.00 to 63.00
Malleable	65.00 to 67.00

Cleveland

No. 1 hvy. melting	$43.00 to $43.50
No. 2 hvy. melting	40.00 to 40.50
No. 1 busheling	43.00 to 43.50
No. 1 bundles	43.00 to 43.50
No. 2 bundles	28.00 to 28.50
Machine shop turn.	35.00 to 35.50
Mixed bor. and turn.	36.00 to 36.50
Shoveling turnings	37.00 to 37.50
Cast iron borings	37.00 to 37.50
Low phos. 2 ft and under	45.50 to 46.00
Steel axle turn.	43.00 to 43.50
Drop forge flashings	43.00 to 43.50
No. 1 RR. hvy. melting	43.50 to 44.00
Rails 3 ft and under	69.00 to 70.00
Rails 18 in. and under	70.00 to 71.00
No. 1 machinery cast.	65.00 to 66.00
RR. cast.	64.50 to 65.00
RR. grate bars	46.00 to 47.00
Stove plate	51.00 to 52.00
Malleable	70.00 to 71.00

Youngstown

No. 1 hvy. melting	$43.50 to $44.00
No. 2 hvy. melting	40.50 to 41.00
No. 1 bundles	43.50 to 44.00
No. 2 bundles	$38.50 to $39.00
Machine shop turn.	35.50 to 36.00
Shoveling turnings	37.50 to 38.00
Cast iron borings	37.50 to 38.00
Low phos. plate	46.00 to 46.50

Buffalo

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.50 to 38.50
No. 1 busheling	37.50 to 38.50
No. 1 bundles	39.50 to 40.00
No. 2 bundles	36.00 to 36.50
Machine shop turn.	32.00 to 33.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Low phos. plate	46.00 to 47.00
Scrap rails, random lgth.	52.00 to 53.00
Rails 2 ft and under	59.00 to 61.00
RR. steel wheels	52.00 to 53.00
RR. spring steel	52.00 to 53.00
RR. couplers and knuckles	52.00 to 53.00
No. 1 machinery cast.	54.00 to 55.00
No. 1 cupola cast.	51.00 to 52.00
Small indus. malleable	60.00 to 62.00

Birmingham

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	31.00 to 32.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	27.00 to 28.00
Bar crops and plate	46.00 to 47.00
Structural and plate	46.00 to 47.00
No. 1 RR. hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	58.00 to 59.00
Rerolling rails	61.00 to 62.00
Rails 2 ft and under	66.00 to 67.00
Angles & splice bars	59.00 to 60.00
Std. steel axles	61.00 to 62.00
No. 1 cupola cast.	59.00 to 60.00
Stove plate	54.00 to 55.00
Cast iron carwheels	46.00 to 47.00

St. Louis

No. 1 hvy. melting	$45.00 to $47.00
No. 2 hvy. melting	40.00 to 41.00
No. 2 bundled sheets	39.00 to 40.00
Machine shop turn.	29.50 to 30.50
Shoveling turnings	32.00 to 33.00
Rails, random lengths	58.00 to 59.00
Rails 3 ft and under	63.00 to 65.00
Locomotive tires, uncut	53.00 to 54.00
Angles and splice bars	62.00 to 64.00
Std. steel car axles	90.00 to 95.00
RR. spring steel	55.00 to 57.00
No. 1 machinery cast.	62.00 to 64.00
Hvy. breakable cast.	51.00 to 53.00
Cast iron brake shoes	49.00 to 50.00
Stove plate	48.00 to 49.00
Cast iron car wheels	61.00 to 62.00
Malleable	70.00 to 72.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.50
No. 2 hvy. melting	$29.00 to 30.00
No. 2 bundles	29.50 to 30.50
Machine shop turn.	26.00 to 26.50
Mixed bor. and turn.	26.00 to 26.50
Shoveling turnings	27.50 to 28.00
Clean cast chem. bor.	36.00 to 37.00
No. 1 machinery cast.	48.00 to 49.00
Mixed yard cast.	43.00 to 44.00
Charging box cast.	43.00 to 44.00
Heavy breakable cast.	43.00 to 44.00
Unstrp. motor blocks	38.00 to 39.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$32.50
No. 2 hvy. melting	$29.50 to 29.92
No. 1 bundles	36.50 to 37.00
No. 2 bundles	$29.00 to $30.00
Machine shop turn.	25.00 to 25.50
Mixed bor. and turn.	24.50 to 25.00
Shoveling turnings	26.00 to 26.50
No. 1 busheling	34.92
Clean cast chem. borings	31.00 to 32.00
No. 1 machinery cast.	47.00 to 48.00
Mixed cupola cast.	42.00 to 43.00
Heavy breakable cast.	39.50 to 40.50
Stove plate	40.50 to 41.50

Detroit

Brokers' buying prices per gross ton, on cars

No. 1 hvy. melting	$37.50 to $41.50
No. 2 hvy. melting	32.50 to 37.00
No. 1 bundles	37.50 to 45.00
New busheling	37.50 to 43.00
Flashings	37.00 to 37.50
Machine shop turn.	29.00 to 29.50
Mixed bor. and turn.	29.00 to 29.50
Shoveling turnings	31.50 to 34.00
Cast iron borings	31.50 to 34.00
Low phos. plate	40.00 to 45.00
No. 1 cupola cast.	58.00 to 60.00
Heavy breakable cast.	49.00 to 51.00
Stove plate	48.00 to 50.00
Automotive cast.	62.00 to 64.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$42.00 to $42.50
No. 2 hvy. melting	39.00 to 39.50
No. 1 bundles	42.00 to 42.50
No. 2 bundles, black	39.00 to 39.50
No. 2 bundles, mixed	32.50 to 33.00
Machine shop turn.	28.50 to 29.00
Mixed bor. and turn.	30.50 to 31.00
Shoveling turnings	31.50 to 32.00
Cast iron borings	31.50 to 32.00
Low phos. 18 in. under	55.00 to 56.00
Rails, random lengths	62.00 to 63.00
Rails, 18 in. and under	71.00 to 72.00
No. 1 cupola cast.	64.00 to 65.00
Hvy. breakable cast.	57.00 to 58.00
Drop broken cast.	69.00 to 70.00

San Francisco

No. 1 hvy. melting		$30.00
No. 2 hvy. melting		28.00
No. 1 bundles		30.00
No. 2 bundles		28.00
No. 3 bundles		25.00
Machine shop turn.		16.00
Elec. fur. 1 ft and under	$40.00 to	42.00
No. 1 RR. hvy. melting		30.00
Scrap rails random lgth.		30.00
No. 1 cupola cast.	43.00 to	46.00

Los Angeles

No. 1 hvy. melting		$30.00
No. 2 hvy. melting		28.00
No. 1 bundles		30.00
No. 2 bundles		28.00
No. 3 bundles		25.00
Mach. shop turn.		16.00
Elec. fur. 1 ft and under	$42.00 to	45.00
No. 1 RR. hvy. melting		30.00
Scrap rails, random lgth.		30.00
No. 1 cupola cast.	48.00 to	50.00

Seattle

No. 1 hvy. melting	$34.00 to	$38.00
No. 2 hvy. melting	34.00 to	38.00
No. 1 bundles		32.00
No. 2 bundles		32.00
No. 3 bundles		18.00
Elec. fur. 1 ft and under	$29.00 to	30.00
RR. hvy. melting		25.00
No. 1 cupola cast		35.00
Heavy breakable cast.		35.00

Hamilton, Ont.

No. 1 hvy. melting	$30.00
No. 1 bundles	30.00
No. 2 bundles	29.50
Mechanical bundles	25.00
Mixed steel scrap	26.00
Mixed bor. and turn.	23.00
Rails, remelting	30.00
Rails, rerolling	33.00
Bushelings	24.50
Bush., new fact, prep'd.	29.00
Bush., new fact, unprep'd.	23.00
Short steel turnings	23.00
Cast scrap	45.00

Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Dec. 5, 1950	Nov. 28, 1950	Nov. 7, 1950	Dec. 6, 1949
Hot-rolled sheets	3.60	3.35	3.35	3.25
Cold-rolled sheets	4.35	4.10	4.10	4.00
Galvanized sheets (10 ga)	4.80	4.40	4.40	4.40
Hot-rolled strip	3.50	3.25	3.25	3.25
Cold-rolled strip	4.75	4.21	4.21	4.038
Plate	3.70	3.50	3.50	3.40
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R-strip (No. 302)	36.50	34.50	34.50	33.00
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.50	$7.75
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.70
Special coated mfg. ternes	6.35	6.35	6.35	6.65
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.45	3.45	3.35
Cold finished bars	4.55	4.15	4.15	3.995
Alloy bars	4.30	3.95	3.95	3.75
Structural shapes	3.65	3.40	3.40	3.25
Stainless bars (No. 302)	31.25	30.00	30.00	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.85	4.50	4.50	4.15
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.40	$3.40	$3.20
Light rails	4.00	3.75	3.75	3.55
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$54.00	$54.00	$52.00
Slabs, rerolling	56.00	54.00	54.00	52.00
Forging billets	66.00	63.00	63.00	61.00
Alloy blooms, billets, slabs	70.00	66.00	66.00	63.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	3.85	3.85	3.40
Skelp	3.35	3.15	3.15	3.25

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*

Pig Iron: (per gross ton)	Dec. 5, 1950	Nov. 28, 1950	Nov. 7, 1950	Dec. 6, 1949
No. 2, foundry, del'd Phila.	56.27	$54.77	$54.77	$50.42
No. 2, Valley furnace	51.00	49.50	49.50	46.50
No. 2, Southern Cin'ti	55.58	52.58	52.58	46.08
No. 2, Birmingham	48.88	45.88	45.88	39.38
No. 2, foundry, Chicago†	52.50	49.50	49.50	46.50
Basic del'd Philadelphia	55.42	53.92	53.92	49.92
Basic, Valley furnace	50.50	49.00	49.00	46.00
Malleable, Chicago†	52.50	49.50	49.50	46.50
Malleable, Valley	52.50	49.50	49.50	46.50
Charcoal, Chicago	70.56	70.56	70.56	68.56
Ferromanganese‡	181.20	181.20	173.40	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$43.75	$43.75	$43.75	$31.75
Heavy melt'g steel, Phila.	38.75	38.75	41.50	24.50
Heavy melt'g steel, Ch'go	39.75	39.75	39.75	27.50
No. 1 hy. com. sh't, Det.	41.25	41.25	37.25	27.50
Low phos. Young'n	46.25	46.25	46.25	33.75
No. 1 cast, Pittsburgh	62.75	60.75	59.75	39.50
No. 1 cast, Philadelphia	56.50	56.50	54.50	38.00
No. 1 cast, Chicago	63.00	62.00	57.00	42.50
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.00
Foundry coke, prompt	16.75	16.75	16.75	15.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	18.50
Copper, Lake, Conn.	24.625	24.625	24.625	18.625
Tin Straits, New York	*$1.40*†	$1.405*	$1.52	$1.00
Zinc, East St. Louis	17.50	17.50	17.50	9.75
Lead, St. Louis	16.80	16.80	16.80	11.80
Aluminum, virgin	19.00	19.00	19.00	17.00
Nickel, electrolytic	51.22	51.22	51.22	42.97
Magnesium, ingot	24.50	24.50	24.50	20.50
Antimony, Laredo, Tex.	32.00	32.00	32.00	32.00

†Tentative. *Revised.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Dec. 5, 1950	4.131¢ per lb.	$51.94 per gross ton	$40.75 per gross ton
One week ago	3.837¢ per lb.	49.69 per gross ton	40.75 per gross ton
One month ago	3.837¢ per lb.	49.69 per gross ton	41.67 per gross ton
One year ago	3.705¢ per lb.	45.88 per gross ton	27.92 per gross ton

	Finished Steel Base Price High	Finished Steel Base Price Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1950	4.128¢ Dec. 1	3.837¢ Jan. 3	$51.94 Dec. 5	$45.88 Jan. 3	$41.67 Nov. 7	$26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jar. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07542¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$50.00[1]													$50.00[31]
Alloy, net ton	$51.00[1,17]													$51.00[31]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$53.00[1]	$53.00[1]	$53.00[1]				$57.00[13]		$53.00[3]	$62.00[36]	$53.00[3]			
Carbon forging billets, net ton	$63.00[1]	$63.00[1,4]	$63.00[1,8]	$63.00[4]			$63.00[28]		$63.00[3,4]	$68.00[36]	$63.00[3]			$68.00[31]
Alloy, net ton	$66.00[1,17]	$66.00[1,4]	$66.00[1]		$66.00[4,42]			$66.00[3]	$66.00[3,4]	$70.00[36]	$66.00[3]			$69.00[31]
PIPE SKELP	3.15[1]						3.15[1,4]							
WIRE RODS	3.85[2] 4.05[18]	3.85[2,4,33]	3.85[2]	3.85[2]			3.85[2]				3.85[3]	3.95[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.35[1,5,9,15]	3.35[23]	3.35[1,8,8]	3.35[4,8]			3.35[1,4,8] 3.75[13]		3.35[3]	3.60[36]		3.35[3]	4.05[23]	3.55[13] 4.15[47]
Cold-rolled	4.10[1,5,7,9,15] 5.10[63]		4.10[1,8,8]	4.10[4,15]		4.10[7]	4.10[4,8]		4.10[3]			4.10[3]	4.80[23]	4.30[13]
Galvanized (10 gage)	4.40[1,9,15]		4.40[1,8]		4.40[4]		4.75[44] 5.50[64]					4.40[3]		
Enameling (12 gage)	4.40[1]		4.40[1,8]	4.40[4]		4.40[7]	4.40[8] 4.90[76] 5.55[64]						5.10[23]	4.70[13]
Long ternes (10 gage)	4.80[9,15]		4.80[1]			4.80[7]	5.30[64]							
HI Str. low alloy, h.r.	5.05[1,5] 5.30[9]	5.05[1]	5.05[1,8,8]	5.05[4,8]			5.05[1,4] 5.30[8] 5.40[13]		5.05[3]	5.05[36]		5.05[3]		5.50[13]
HI str. low alloy, c.r.	6.20[1,5] 6.45[9]		6.20[1,8,8]	6.20[4,8]			6.20[4] 6.45[8]		6.20[3]			6.20[3]		6.65[13]
Hi str. low alloy, galv.	6.75[1]											6.75[3]		
STRIP Hot-rolled	3.25[5,7,9] 3.50[38] 3.75[41,58]	3.25[5,55]	3.25[1,8,8]	3.25[5]			3.25[1,4,8] 3.75[13]		3.25[3]	3.50[36]		3.25[3]		3.45[13] 4.05[47]
Cold-rolled	4.15[5,7,9] 4.85[53,58]	4.50[64]	4.30[8]	4.15[2,8]		4.15[7]	4.15[4,8,48] 4.85[13,40] 4.75[49]		4.15[3]			4.15[3]		4.35[13] 4.95[47] 5.10[31,48]
HI str. low alloy, h.r.	5.50[9]		4.95[1,8,8]	4.95[5]			4.95[1,4] 5.20[8] 5.30[13]		4.95[3]	4.95[36]		4.95[3]		5.40[13]
Hi Str. low alloy, c.r.	6.45[9]			6.20[2,8]			6.20[4] 6.45[8] 6.55[13]		6.40[3]			6.40[3]		6.40[13]
TINPLATE† Cokes, 1.50-lb base box 1.25 lb, deduct 20¢	$7.50[1,5,9,15]		$7.50[1,8,8]				$7.50[4]					$7.60[3]	$7.70[23]	
Electrolytic 0.25, 0.50, 0.75 lb box	Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.30[1,5,15]		5.30[1,8]				5.30[4]					5.40[3]	5.50[23]	
BARS Carbon steel	3.45[1,5,9]	3.45[1,4,33]	3.45[1,8,8]	3.45[4]	3.45[4]		3.45[1,4,8]		3.45[3,4]		3.45[3]			3.85[13]
Reinforcing‡	3.45[1,5]	3.45[4]	3.45[1,8,8]	3.45[4]			3.45[1,4,8]		3.45[3,4]		3.45[3]	3.45[3]		
Cold-finished	4.15[4,5,17,52,69,71] 4.55[2]	4.15[2,23,69,70]	4.15[4,73,74]	4.15[2,61]	4.15[4,52,69]		4.15[5,40,57]		4.15[79]					4.35[13] 4.30[64]
Alloy, hot-rolled	3.95[1,17]	3.95[1,4,23]	3.95[1,8,8]		3.95[4]		3.95[1,8,35]	3.95[3]	3.95[3,4]		3.95[3]			4.25[13] 4.10[21]
Alloy, cold-drawn	4.90[2,17,52,69,71]	4.90[2,23,69,70]	4.90[4,73,74]	4.90[2,61]	4.90[4,42,52]		4.90[8,35,57]	4.90[3]	4.90[3,79]					5.05[64]
Hi str. low alloy, h.r.	5.20[1,5]		5.20[1,8,8]	5.20[4]			5.20[1] 5.45[8]	5.20[3]	5.20[3]		5.20[3]			5.65[13]
PLATE Carbon steel	3.50[1,5]	3.50[1]	3.50[1,8,8]	3.50[4]			3.50[1] 3.75[13]		3.50[3]	3.75[36]	3.50[3]	3.50[3]	4.20[23]	3.75[13]
Floor plates	4.55[1]	4.55	4.55[3]	4.55[5]						4.55[36]				
Alloy	4.40[1]	4.40[1]	4.40[1]				4.75[13]			4.85[36]	4.40	4.40[3]		
Hi Str. low alloy	5.35[1,5]	5.35[1]	5.35[1,3]	5.35[4,8]			5.90[8] 5.70[13]			5.35[36]	5.35[3]	5.35[3]		5.85[13]
SHAPES, Structural	3.40[1,5,9]	3.40[1,33]	3.40[1,8,8]					3.45[3]	3.45[3]		3.45[3]			
Hi str. low alloy	5.15[1,5]	5.15[1]	5.15[1,8,8]				5.40[8]	5.20[3]	5.20[3]		5.20[3]			
MANUFACTURERS' WIRE Bright	4.50[2,5] 4.75[18]	4.50[2,4,13,34] 4.80[23]		4.50[2,77]			4.50[8]	Kokomo—4.80[18]			4.50[3]	4.60[3]	Duluth—4.50[2] Pueblo—4.75[14]	
PILING, Steel Sheet	4.20[1,9]	4.20[1]							4.20[3]					

NOTE: For U. S. Steel Corp. subsidiaries, Bethlehem Steel Co., Republic Steel Corp., Jones & Laughlin Steel Corp., Wheeling Steel Corp., Allegheny Ludlum Steel Corp., Youngstown Sheet and Tube, add the following amounts indicated to above prices to obtain new price. Carbon steel products: blooms, billets, slabs—forging, add $3 per net ton; rerolling, add $3 per net ton; skelp, add 0.20c per lb; bars and small shapes, add

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$76.00		INGOTS Carbon forging, net ton
	$88.00[83]		F=$77.00		Alloy, net ton
		$83.00[11]	F=$72.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$71.00[83]	$83.00[11]	F=$82.00[19]	Geneva=$83.00[16]	Carbon forging billets, net ton
	$74.00[83]		F=$85.00[19]		Alloy net ton
					PIPE SKELP
	4.25[83]	3.85[11]	SF=4.50[24] LA=4.65[24,62]	Portsmouth=3.85[30] Worcester=4.15[3]	WIRE RODS
		3.35[4,11]	SF, LA=4.05[24] F=4.25[19]	Ashland=3.35[7] Niles=3.80[64], Geneva=3.45[16]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.10[11]	SF=5.05[24] F=5.00[19]		Cold-rolled
		4.40[4,11]	SF, LA=5.15[24]	Ashland=4.40[7] Kokomo=4.50[30]	Galvanized (10 gage)
		4.40[11]			Enameling (12 gage)
					Long ternes (10 gage)
		5.05[11]	F=6.00[19]		Hi str. low alloy, h.r.
			F=7.05[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
3.85[83]	3.85[83]	3.25[11]	SF, LA=4.00[24,62] F=4.40[19], S=4.25[83]	Ashland=3.25[7] Atlanta=3.80[66] Minnequa=4.30[14]	STRIP Hot-rolled
			F=5.75[19] LA=5.85[27]	New Haven=4.95[2], 5.35[68] Trenton=5.00[43]	Cold-rolled
		4.95[11]	F=5.90[19]		Hi str. low alloy, h.r.
			F=6.95[19]		Hi str. low alloy, c.r.
		7.80[11]	SF=8.25[24]		TINPLATE Cokes, 1.50-lb base box 1.25 lb, deduct 20¢
Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.05[83]	3.85[83]	3.45[4,11]	SF, LA=4.15[24] LA=4.15[62]	Atlanta=4.00[66]	BARS Carbon steel
4.05[83]	3.85[83]	3.45[4,11]	SF, S=4.20[83] F=4.10[19]	Atlanta=4.00[66] Minnequa=4.25[14]	Reinforcing‡
				Putnam, Newark=4.55[69]	Cold-finished
4.55[83]	4.35[83]		LA=5.00[62] F=4.95[19]		Alloy, hot-rolled
				Newark,[69] Worcester[3]=5.20 Hartford=5.20[4]	Alloy-, cold-drawn
		5.20[11]	F=6.25[19]		Hi str. low alloy, h.r.
	3.90[83]	3.50[4,11]	F=4.10[19] S=4.40[83] Geneva=3.50[16]	Claymont=3.90[29] Coatesville=3.90[21] Harrisburg=4.25[38]	PLATE Carbon steel
				Harrisburg=5.25[38]	Floor plates
			F=5.40[19]	Coatesville=4.80[21]	Alloy
		5.35[11]	F=5.95[19]	Geneva=5.35[16]	Hi str. low alloy
4.00[83]	3.80[83]	3.40[11]	SF=3.95[62] LA=4.00[24,62]	Phoenixville=4.25[56] Gen'a=3.40[16] Minnequa=3.85[14]	SHAPES, Structural
		5.15[11]	F=4.00[19] S=4.05[83]	Fontana=5.75[19] Geneva=5.15[16]	Hi str. low alloy
5.10[83]	4.90[83]	4.50[4,11]	SF, LA=5.45[24,62,14]	Portsmouth=4.50[29] Worcester=4.80[3]	MANUFACTURERS' WIRE Bright

Notes: †Special coated mfg ternes deduct $1.15 from 1.50-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $1.90 from 1.50-lb coke base box. ‡Straight lengths only from producer to fabricator.

KEY TO STEEL PRODUCERS

With Principal Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio*
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind.
88 National Supply, Toledo, Ohio
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.

*Add 10 pct to quoted prices

0.25c; reinforcing bars, add, 0.25c; hot-rolled sheets (18 gage and heavier) add 0.25c; hot-rolled strip, 0.25c; galvanized sheets (10 gage) 0.40c; Alloy Steel products: blooms, billets, slabs—forging, add $4 per net ton; ingots, add $3 per net ton; hot-rolled bars, 0.35c; plates, 0.35c; hot-rolled strip, 0.55c. Superior Steel, h-r strip, add 0.25c.

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	13.75	14.50	16.00	15.50	23.75	19.25	21.00	12.25	14.25	12.50
Slabs, billets, rerolling	18.00	19.25	21.25	20.25	31.25	25.50	27.75	16.50	19.50	16.25
Forg. discs, die blocks, rings	32.00	32.00	34.50	33.50	50.50	38.00	42.50	28.00	26.50	26.50
Billets, forging	25.75	25.75	27.75	27.00	40.50	30.50	34.25	21.00	21.50	21.50
Bars, wire, structurals	30.00	30.00	32.50	31.50	47.50	35.50	40.00	24.50	25.00	25.00
Plates	32.00	32.00	34.00	34.00	50.50	38.50	44.00	28.00	26.50-27.00	26.50
Sheets	39.00	39.00	41.00	41.00	54.50	47.00	51.50	34.50	35.00	37.00
Strip, hot-rolled	25.50	27.00	31.25	29.00	47.25	35.75	40.00	22.50	29.25	23.00
Strip, cold-rolled	32.00	34.50	38.00	36.50	56.50	46.00	50.00	28.50	35.00	29.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; *Ft. Worth, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

* Add 10 pct to quoted prices.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb.

	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer-1	3.40	3.75	4.40	....	....	....	....	....
Chicago-4	....	....	....	5.60	....	....	....	....
Ensley-11	3.40	3.75	....	....	....	....	....	....
Fairfield-11	....	3.75	4.40	....	....	8.60	4.20	....
Gary-1	3.40	3.75	....	....	....	....	4.20	....
Ind. Harbor-8	3.40	....	4.40	5.60	5.25	8.60	4.20	....
Johnstown-3	....	3.75	....	....	5.25	8.60	....	....
Joliet-1	....	3.75	4.40	....	....	....	....	....
Kansas City-83	....	....	....	5.85	....	....	....	....
Lackawanna-3	3.40	3.75	4.40	....	....	8.60	4.20	....
Lebanon-3	....	....	....	5.60	....	....	....	8.85
Minnequa-14	3.40	3.75	4.40	5.60	....	8.60	4.20	8.85
Pittsburgh-77	....	....	....	....	....	....	....	8.85
Pittsburgh-78	....	....	....	....	....	....	....	8.85
Pittsburgh-5	....	....	....	5.60	....	....	....	....
Pittsburgh-24	....	....	....	....	....	....	4.35	....
Seattle-82	....	....	....	6.10	....	....	4.35	....
Steelton-3	3.40	....	4.40	....	....	....	4.20	....
Struthers-6	....	....	....	5.60	....	....	....	....
Torrance-24	....	....	....	....	....	....	4.35	....
Youngstown-4	....	....	....	5.60	....	....	....	....
Weirton-9	....	....	....	....	....	....	4.20	....

Track Bolts, heat treated, to railroads, 9.10¢ per lb.

BOILER TUBES

Seamless steel, electric welded commercial boiler tubes, locomotive tubes, minimum wall, per 100 ft at mill, c.l. lots, cut lengths 10 to 24 ft.

OD in.	gage BWG	Seamless H.R.	Seamless C.R.	Electric H.R.	Weld C.D.
2	13	$20.61	$24.24	$19.99	23.51
2½	12	27.71	32.58	26.88	31.60
3	12	30.82	36.27	29.90	35.18
3½	11	38.52	45.35	37.36	43.99
4	10	47.82	56.25	46.39	54.56

Pittsburgh Steel add, H-R: 2 in., 62¢; 2½ in., 84¢; 3 in., 92¢; 3½ in., $1.17; 4 in., $1.45. Add, C-R: 2 in., 74¢; 2½ in., 99¢; 3 in., $1.10; 3½ in., $1.37; 4 in., $1.70.

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net: Effective CaF, content:

70% or more	$41.00
60% or less	38.00

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Ann'ld. ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City-4	106	116	....	113	126	126	5.35	5.80
Aliquippa, Pa.-5	106	120	....	....	126	130	5.35	5.80
Atlanta-65	113	123	....	119	126	133	5.70	5.95
Bartonville-34	106	116	....	113	126	126	5.35	5.80
Buffalo-85	....	....	....	....	....	....	4.50	....
Chicago-4	106	116	....	113	126	126	....	....
Cleveland-86	111	....	....	....	....	....	....	....
Cleveland-2	....	....	....	....	....	....	5.35	5.50
Crawfordsville-87	112	123	....	120	....	135	5.45	5.95
Denora, Pa.-2	106	120	....	113	126	130	5.35	5.50
Duluth-2	106	120	116	113	126	130	5.35	5.50
Fairfield, Ala.-11	106	120	....	113	126	130	5.35	5.80
Houston-83	114	124	....	....	126	134	5.75	6.00
Johnstown, Pa.-3	106	120	125	....	126	130	5.35	5.80
Joliet, Ill.-2	106	114	116	113	126	130	5.35	5.50
Kokomo, Ind.-30	112	123	....	120	126	135	5.70	5.95
Los Angeles-62	....	....	....	....	....	....	6.30	....
Kansas City-83	118	128	....	125	126	138	5.95	6.20
Minnequa-14	111	128	121	118	126	136	5.60	6.10
Monessen-16	112	123	....	....	126	133	5.60	5.85
Moline, Ill.-4	....	....	112	....	....	....	....	....
Palmer-85	....	....	....	....	....	....	4.60	....
Pittsburg, Cal.-24	125	143	....	137	146	150	6.30	6.45
Portsmouth-20	106	116	....	113	126	126	5.35	5.60
Rankin, Pa.-2	106	120	....	....	126	130	5.35	5.50
San Francisco-14	....	....	....	....	....	....	....	....
So. Chicago, Ill.-4	106	116	116	113	....	126	5.35	5.60
So. San Francisco-14	....	....	....	137	....	151	6.30	6.80
Sparrows Pt.-3	106	....	....	115	126	132	5.45	5.90
Sterling, Ill.-33	112	118	....	119	126	133	5.65	5.85
Struthers, Ohio-6	....	....	....	....	....	....	5.35	5.60
Torrance, Cal.-24	126	....	....	....	....	....	6.30	....
Worcester-2	112	....	....	....	....	....	5.85	6.10
Williamsport, Pa.-51	....	....	130	....	....	....	....	....

Cut Nails, carloads, base $6.75 per 100 lb, (less 20¢ to jobbers) at Conshohocken, Pa., (26), Wareham, Mass. (53) Wheeling, W. Va., (15).

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago	$95.30 to $98.80
6 to 24-in., del'd N. Y.	94.50 to 95.50
6 to 24-in., Birmingham	81.50 to 86.00

6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less ..... $108.50 to $113.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD ½ in. Blk.	Gal.	¾ in. Blk.	Gal.	1 in. Blk.	Gal.	1¼ in. Blk.	Gal.	1½ in. Blk.	Gal.	2 in. Blk.	Gal.	2½-3 in. Blk.	Gal.	SEAMLESS 2 in. Blk.	Gal.	2½-3 in. Blk.	Gal.	3½-4 in. Blk.	Gal.
STANDARD T. & C.																				
Bethlehem-3	34.0	12.0	37.0	17.0	39.5	19.5	40.0	20.0	41.5	21.0	41.0	21.5	41.5	22.0	....	....	....	....	....	....
Cleveland-4	40.5	16.5	43.5	22.5	46.0	26.0	46.5	26.5	47.0	27.5	47.5	28.0	48.0	28.5	....	....	....	....	....	....
Oakland-19	29.5	7.5	32.5	11.5	35.0	15.0	35.5	15.5	36.0	26.0	36.5	17.0	37.0	27.5	....	....	....	....	....	....
Pittsburgh-5	40.5	18.5	42.5	21.5	44.0	28.0	45.0	25.0	45.0	25.5	45.5	26.0	46.5	27.0	34.5	14.5	38.0	18.0	40.0	20.0
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
St. Louis-32	39.5	17.5	42.5	21.5	44.5	24.5	45.0	25.0	45.0	25.5	45.5	26.0	46.0	26.5	....	....	....	....	....	....
Sharon-90	39.5	17.5	42.5	21.5	44.5	24.5	45.0	25.0	45.0	25.5	45.5	26.0	46.0	26.5	....	....	....	....	....	....
Toledo-88	40.5	18.5	42.5	21.5	44.0	24.0	45.0	25.0	45.0	25.5	45.5	26.0	46.5	27.0	36.0	....	39.0	....	41.0	....
Wheeling-15	40.5	18.5	43.5	22.5	46.0	26.0	46.5	26.5	47.0	27.5	47.5	28.0	48.0	28.5	....	....	....	....	....	....
Wheatland-89	40.5	18.5	42.5	21.5	44.0	24.0	45.0	25.0	45.0	25.5	45.5	26.0	46.5	27.0	....	....	....	....	....	....
Youngstown-6	40.5	18.5	43.5	22.5	46.0	26.0	46.5	26.5	47.0	27.5	47.5	28.0	48.0	28.5	36.0	16.0	39.0	19.0	41.0	21.0
EXTRA STRONG, PLAIN ENDS																				
Bethlehem-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	....	....	....	....	....	....
Cleveland-4	39.5	19.0	43.5	23.0	45.5	26.5	46.0	27.0	46.5	28.0	47.0	28.5	47.5	29.0	....	....	....	....	....	....
Oakland-19	28.5	8.0	32.5	12.0	34.5	15.5	35.0	16.0	35.5	17.0	36.0	17.5	36.5	18.0	....	....	....	....	....	....
Pittsburgh-5	36.0	17.5	42.0	21.5	42.5	23.5	43.5	24.5	43.5	25.0	47.0	28.5	45.0	26.5	32.5	13.5	37.0	18.0	40.5	21.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
St. Louis-32	38.5	18.0	42.5	22.0	44.0	25.0	44.5	25.5	44.5	26.0	45.0	26.5	45.5	27.0	....	....	....	....	....	....
Sharon-90	38.5	18.0	42.5	22.0	44.0	25.0	44.5	25.5	44.5	26.0	45.0	26.5	45.5	27.0	....	....	....	....	....	....
Toledo-88	39.5	19.0	43.5	23.0	45.5	26.5	46.0	27.0	46.5	28.0	47.0	28.5	47.5	29.0	36.0	....	39.0	....	42.5	....
Wheeling-15	39.5	19.0	43.5	23.0	45.5	26.5	46.0	27.0	46.5	28.0	47.0	28.5	47.5	29.0	....	....	....	....	....	....
Wheatland-89	38.0	17.5	42.0	21.5	42.5	23.5	43.5	24.5	43.5	25.0	44.0	25.5	45.0	26.5	....	....	....	....	....	....
Youngstown-6	39.5	19.0	43.5	23.0	45.5	26.5	46.0	27.0	46.5	28.0	47.0	28.5	47.5	29.0	35.0	16.0	39.0	20.0	42.5	23.5

Galvanized discounts based on zinc at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢.

Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct.

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb. (Metropolitan area delivery, add 20¢ to base price except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul (*), add 15¢; Philadelphia, add 25¢; Chicago, add 30¢).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (18 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140 Ann.
Baltimore	5.18	6.39[1]	6.65[2] 6.65	5.89–5.99[11]	....	5.40–6.04[11]	5.89	5.89	6.19	9.69	9.99	11.12	11.49
Birmingham*	5.15[10]	6.06	6.15[7]	5.10	....	5.55	5.25	5.10	6.00	....	....	....	....
Boston	5.75	6.50[10]	6.04[2] 7.14	5.70	6.90–6.98	6.09	5.75	5.60	6.19–6.69	9.70–9.97	9.50–10.00	11.18	11.49
Buffalo	5.15	5.98	6.04	5.41	7.27	5.68	5.35	5.15	5.75	9.60	9.90	11.08	11.39
Chicago*	5.15	6.20	6.68	5.10	6.30	5.40	5.25	5.10	5.60	9.25	9.85	10.70	11.00
Cincinnati*	5.42–5.97	5.98–6.24	6.39	5.35	....	5.70	5.64	5.35–5.64	5.95–6.25	9.80–9.81	9.90–10.11	11.05–11.26	11.36–11.58
Cleveland	5.15	5.98	7.00–7.10	5.24	6.35	5.52	5.37	5.12	5.75	9.35	9.85	10.81	11.11
Detroit	5.33	6.08–6.33	7.09	5.49	6.43–6.80	5.89–5.79	5.64–5.66	5.30	5.91	9.86	9.98	11.01	11.31
Houston	6.00	....	....	6.10	....	6.00	5.95	6.10	7.60	10.35–10.45	10.50–10.60	11.50	11.95–12.10
Indianapolis	....	....	....	....	7.36	....	....	....	6.15	....	....	....	....
Kansas City	5.75	6.85[10]	7.55	5.70	6.95	6.00	5.85	5.70	6.35	9.85	10.15	11.30	11.60
Los Angeles	5.90	7.45	7.70[2]	5.95	6.70[10]	6.00	5.90	5.90	7.55	10.75	10.75	12.45	12.75
Memphis	5.93	6.68	....	5.98	6.80–6.51	6.08	5.93	5.68	6.31	....	....	....	....
Milwaukee	5.29	6.09	6.94–6.99	5.24	6.32	5.54	5.39	5.24	5.89	9.39	9.69	10.84	11.14
New Orleans*	5.60[1]	6.75	....	5.55[1]	6.80	5.95	5.55[1]	5.55[1]	6.75	....	....	....	....
New York	5.52	6.55[1] 6.64	7.54[2]	5.84	6.90[1] 6.70	5.88	5.68	5.67	6.80 6.44	9.60	9.90	11.08	11.38
Norfolk	6.10[13]	7.00	....	6.30[13]	....	6.15[13]	6.20[13]	6.15[13]	7.20[13]	....	....	....	....
Philadelphia*	6.05	6.20–6.35	6.85[2] 7.25	5.65	6.29	5.65	5.45	5.60	6.21	9.35	9.85	10.80	11.10
Pittsburgh	5.60	6.40	7.75	5.65	5.95–6.00	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60–7.10[1]	8.40[2]	....	6.85[9]	....	6.40[9]	6.50	6.45–6.45[9]	6.80[14]	12.80[15]	11.80[15]	....	....
Salt Lake City	5.85	6.70	....	7.45	6.75	6.10[3]	5.90	7.35[3]	6.75	....	....	....	....
San Francisco*	6.20	7.60[2]	7.75[2]	6.15	7.85[10]	6.10	6.00	6.00	7.55	10.75	10.75	12.45	12.75
Seattle	6.60[4]	8.15[2]	8.40[2]	6.35[4]	....	6.35[4]	6.20[4]	6.35[4]	8.50[14]	....	11.80[15]	....	13.80[15]
St. Louis	5.48	6.28	7.18	5.43	7.30	5.73	5.58	5.43	6.08	9.58	9.88	11.03	11.33
St. Paul*	5.71	6.51	7.41	5.66	6.16–6.82	5.96	5.81	5.66	6.31	9.81	10.11	11.28	11.58

BASE QUANTITIES *(Standard unless otherwise keyed on prices.)*
Hot-rolled sheets and strip, hot rolled bars and bar shapes, structural shapes, plate, galvanized sheets and cold-rolled sheets: 2000 to 9999 lb. Cold-finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb.

All HR products may be combined to determine quantity bracket. All galvanized sheets may be combined to determine quantity bracket. CR sheets may not be combined with each other or with galv. sheets to determine quantity bracket.

Exceptions:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 to 5999 lb; (6) 1000 lb and over; (7) 500 to 1499 lb; (8) 400 lb and over; (9) 400 to 9999 lb; (10) 500 to 9999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 9999 lb; (16) 6000 lb and over; (17) up to 1999 lb; (18) 1000 to 4999 lb; (19) 1500 to 3499 lb; (20) CR sheets may be combined for quantity; (21) 3 to 24 bundles.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	54.00	54.50	55.00	55.50	.....
Birmingham	48.38	48.88	.. ..	.....	.....
Buffalo	52.00	52.50	53.00	.....	.....
Chicago	52.00	52.50	52.50	53.00	.....
Cleveland	52.00	52.50	52.50	53.00	57.00
Daingerfield, Tex.	48.00	48.50	48.50	.....	.....
Duluth	52.00	52.50	52.50	53.00	.....
Erie	52.00	52.50	52.50	53.00	.....
Everett	.....	52.25	52.75	.....	.....
Fontana	55.00	55.50	.....	.....	.....
Granite City	50.90	51.40	51.90	.....	.....
Hubbard	.....	.....	52.50	.....	.....
Ironton, Utah	49.00	49.50	.....	.....	.....
Pittsburgh	49.00*	.....	.....	50.00	.....
Neville Island	52.00	52.50	52.50	53.00	.....
Provo, Utah	49.00	49.50	.....	.....	.....
Sharpsville	52.00	52.50	52.50	53.00	.....
Steelton	54.00	54.50	55.00	55.50	60.00
Swedeland	53.00	53.50	54.00	54.50	.....
Toledo	52.00	52.50	52.50	53.00	.....
Troy, N. Y.	54.00	54.50	55.00	.....	60.00
Youngstown	49.00	49.50	52.50	50.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$3.80–.90	.....	52.95–53.05	53.55–53.75	.....	.....
Boston	Steelton	8.90	.....	.....	.....	.....	63.90
Brooklyn	Bethlehem	4.29	.....	55.79	56.29	56.79	.....
Cincinnati	Birmingham	6.70	55.08	55.58	.....	.....	.....
Jersey City	Bethlehem	2.63	.....	54.13	54.63	55.13	.....
Los Angeles	Geneva-Ironton	7.70	56.70	57.20	.....	.....	.....
Los Angeles	Fontana	.....	56.70	57.20	.....	.....	.....
Mansfield	Cleveland, Toledo	3.33	55.33	55.83	55.83	56.33	60.33
Philadelphia	Bethlehem	2.39	56.39	56.89	57.39	57.89	.....
Philadelphia	Swedeland	1.44	54.44	54.94	55.44	55.94	.....
Philadelphia	Steelton	3.09	57.09	57.59	58.09	58.59	63.09
Rochester	Buffalo	2.63	54.63	55.13	55.63	.....	.....
San Francisco	Geneva-Ironton	7.70	56.70	57.20	.....	.....	.....
San Francisco	Fontana	.....	56.70	57.20	.....	.....	.....
Seattle	Geneva-Ironton	7.70	56.70	57.20	.....	.....	.....
Seattle	Fontana	.....	56.70	57.20	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Syracuse	Buffalo	3.58	55.58	56.08	56.58	.....	.....

* *Monessen, $54.00.*

Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct, $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct C/L per g.t., f.o.b. Jackson, Ohio—$59.50; f.o.b. Buffalo, $60.75. Add $1.50 per ton for each additional 0.50 pct Si up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $62.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $70.56. High phosphorus charcoal pig iron is not being produced.

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List Less Case C.
½ in. & smaller x 6 in. & shorter	23 35
9/16 in. & ⅝ in. x 6 in. & shorter	26 37
¾ in. & larger x 6 in. & shorter	26 37
All diam. longer than 6 in.	22 34
Lag, all diam. x 6 in. & shorter	30 41
Lag, all diam. longer than 6 in.	28 39
Plow bolts	40 —

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List Less Keg K. (Reg)	Less Keg K. (Hvy)
½ in. & smaller	23 35	23 35
9/16 in. & ⅝ in.	20 32	15 28
¾ in. to 1½ in. inclusive	23 35	10 24
1⅛ in. & larger	16 29	10 24

Nuts, Hot Pressed—Hexagon

½ in. & smaller	33 43	29 40
9/16 in. & ⅝ in.	24 36	15 28
¾ in. to 1½ in. inclusive	20 32	11 25
1⅛ in. & larger	17 30	11 25

Nuts, Cold Punched—Hexagon

½ in. & smaller	33 43	29 40
9/16 in. & ⅝ in.	30 41	25 37
¾ in. to 1½ in. inclusive	27 38	20 33
1⅛ in. & larger	20 32	15 28

Nuts, Semi-Finished—Hexagon

	Reg	Hvy
½ in. & smaller	41 50	35 45
9/16 in. & ⅝ in.	36 46	29 40
¾ in. to 1½ in. inclusive	31 42	23 35
1⅛ in. & larger	21 33	17 30
	Light	
7/16 in. & smaller	41 50	
½ in. thru ⅝ in.	35 45	
¾ in. to 1½ in. inclusive	33 43	

Broken case or keg add 15 pct.

Stove Bolts

	Pct Off List
Packaged, steel, plain finished	56—10
Packaged, plated finish	41—10
Bulk, plain finish**	67*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb
½ in. & larger	$7.25
	Pct Off List
7/16 in. & smaller	43

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	53
¾ in. thru 1 in. up to & including 6 in.	53
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	51
⅝ in. thru 1 in. up to & including 6 in.	46
Milled studs	33
Flat head cap screws, listed sizes	24
Fillister head cap, listed sizes	43
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	57

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	$8.10
Old range, nonbessemer	7.95
Mesabi, bessemer	7.85
Mesabi, nonbessemer	7.70
High phosphorus	7.70

After Jan. 25, 1950, increases or decreases in Upper Lake rail freight, dock handling charges and taxes are for buyers' account.

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb
	GRAPHITE	
17, 18, 20	60, 72	17.00¢
8 to 16	48, 60, 72	17.00¢
7	48, 60	18.64¢
6	48, 60	19.95¢
4, 5	40	20.48¢
3	40	21.53¢
2½	24, 30	22.05¢
2	24, 30	24.15¢
	CARBON	
40	100, 110	7.65¢
35	65, 110	7.65¢
30	65, 84, 110	7.65¢
24	72 to 104	7.65¢
20	84, 90	7.65¢
17	60, 72	7.65¢
14	60, 72	8.16¢
10, 12	60	8.42¢
8	60	8.67¢

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. (21)	*28.00	
Washgtn, Pa, (39)	*28.00	
Claymont, Del. (29)	*28.00	
Conshohocken, Pa. (26)		*24.00
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon		
10 pct, Coatesville (21)	31.00	
Inconel-carbon		
10 pct, Coatesville (21)	39.00	
Monel-carbon		
10 pct, Coatesville (21)	32.00	
No. 302 Stainless - copper-stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.00
18	4	1	—	5	$1.565
18	4	2	—	—	$1.13
1.5	4	1.5	8	—	71.5¢
6	4	2	6	—	76.5¢

High-carbon-chromium ..... 57.5¢
Oil hardened manganese ..... 32¢
Special carbon ..... 29.5¢
Extra carbon ..... 24.5¢
Regular carbon ..... 21¢

Warehouse prices on and east of Mississippi are 3¢ per lb higher. West of Mississippi, 5¢ higher.

ELECTRICAL SHEETS

22 gage, HR cut lengths, f.o.b. mill

	Cents per lb.
Armature	*6.20
Electrical	*7.25
Motor	*7.95
Dynamo	8.75
Transformer 72	9.30
Transformer 65	9.35
Transformer 58	10.55
Transformer 52	11.35

PRODUCING POINTS—Beech Bottom, W. Va., 15; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22*, add 70¢; Indiana Harbor, Ind., 3; Mansfield, Ohio, 75; Niles, Ohio, 64, add 30¢; Vandergrift, Pa., 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$16.50 to $17.00
Foundry, oven coke	
Buffalo, del'd	$25.35
Chicago, f.o.b.	21.00
Detroit, f.o.b.	23.00
New England, del'd	24.30
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	22.10
Swedeland, Pa., f.o.b.	22.00
Plainesville, Ohio, f.o.b.	23.25
Erie, del'd	$22.29 to 22.50
Cleveland, del'd	22.62
Cincinnati, del'd	22.71
St. Paul, f.o.b.	21.00
St. Louis, f.o.b.	24.90
Birmingham, del'd	20.79

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.50¢
0.41 to 0.60 carbon	5.95¢
0.61 to 0.80 carbon	6.55¢
0.81 to 1.05 carbon	8.50¢
1.06 to 1.35 carbon	10.80¢

Worcester, add 0.30¢; Sharon, New Britain, Carnegie, New Castle, add 0.35¢; Detroit, 0.26 to 0.40 carb., add 60¢; other grades add 20¢. New Haven, 0.26 to 0.40 carb., add 85¢; other grades add 30¢.

REFRACTORIES

Fire Clay Brick *(F.o.b. works) Carloads, Per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	8.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.75

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Chester	$77.00

Magnesite Brick

Standard, Baltimore	$99.00
Chemically bonded, Baltimore	88.00

Grain Magnesite *St. ¾-in. grain*

Domestic, f.o.b. Baltimore, in bulk fines removed	$62.70
Domestic, f.o.b. Chewelah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ $13.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	36.0¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe	43.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	70.0¢ to $1.35
Aluminum	29.00¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.25¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium 100-199 lb.	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity	$3.50
Lead	6.5¢ plus metal value
Manganese	52.00¢
Molybdenum, 99%	$2.45
Nickel, unannealed	75.5¢
Nickel, annealed	81.5¢
Nickel, spherical, unannealed	78.5¢
Silicon	34.00¢
Solder powder	6.5¢ to 8.5¢ plus met. value
Stainless steel, 302	75.00¢
Tin	11.00¢ plus metal value
Tungsten, 99%	$3.40
Zinc, 10 ton lots	20.50¢ to 23.25¢

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.25	0.20% C	29.25
0.10% C	29.75	0.50% C	29.00
0.15% C	29.50	1.00% C	28.75
2.00% C			28.50
65-69% Cr, 4-9% C			21.75
62-66% Cr, 4-6% C, 6-9% Si.			22.60

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.35

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% Max. C.	$1.09
0.50% max. C.	1.05
.00 min. C	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.00¢ per lb of contained Si. Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.20¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont., Ashtabula, O.	$185
F.o.b. Johnstown, Pa.	$187
F.o.b. Sheridan, Pa.	$185
F.o.b. Etna, Clairton, Pa.	$176

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$69.00	$70.00
Pgh. or Chicago	70.00	71.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	29.75
Ton lots	31.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn ..... 19.15¢

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd., Mn. 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C	25.75	27.60	28.80
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.50% max. C	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si	21.25	23.10	24.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C deduct 0.2¢.

Carload bulk	9.60
Ton lots	11.25
Briquet, contract basis carlots, bulk delivered, per lb of briquet	10.85
Ton lots	11.45

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $86.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $80.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.75
Ton lots	8.35

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered

25% Si	19.00	75% Si	14.30
50% Si	12.00	85% Si	15.55
90-95% Si			17.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
- Carload ..... 8.15¢
- Ton lots ..... 9.55¢

Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo $1.15

Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.
- Ton lots $4.90
- Less ton lots 4.95

Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
- 10 tons to less carload 75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
- Less ton lots $1.55

Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $2.50

Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.
- Openhearth ..... $3.00-$3.05
- Crucible 3.10- 3.15

High speed steel (Primos) 3.25

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
- bags, f.o.b. Washington, Pa Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
- Carload, bulk, lump ..... 11.00¢
- Ton lots, bulk lump ..... 11.50¢
- Less ton lots, lump ..... 12.25¢

Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
- Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
- Carload, bulk ..... 7.00¢

Boron Agents

Contract prices per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B $4.25

Bortam, f.o.b. Niagara Falls
- Ton lots, per pound ..... 45¢
- Less ton lots, per pound ..... 50¢

Carbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.
- Ton lots, per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max Si, 0.50% max. Al, 0.50% max. C, 1 in x D. Ton lots $1.20
- F.o.b. Wash., Pa.; 100 lb, up
- 10 to 14% B. ..... .75
- 14 to 19% B. 1.20
- 19% min. B. 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
- No. 1 ..... $1.00
- No. 6 ..... 63¢
- No. 79 ..... 50¢

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.
- Ton lots $1.46
- Less ton lots 1.57

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
- Less ton lots $1.80

Silcaz, contract basis, delivered.
- Ton lots ..... 45.00¢

THE CLEARING HOUSE

The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Wild Market Due—An acute shortage of good used machines is skyrocketing prices in the Cleveland area, according to dealers. The popular consensus is that the wildest market in the history of the used machine tool trade will be seen within the next 6 months.

Signs of this impending dilemma, according to some used machinery sellers, many of whom let good inventory go cheap 10 months ago, are the following:

Buyers are coming back to take another look at machines that they weren't interested in 6 months ago.

Sub-contract work has not as yet been very widely distributed and hasn't reached the small shops; however, when this happens, machines will be needed and the demand will increase sharply.

Some of the larger shops have already begun buying used equipment; this is being done in anticipation of increases in prime and sub-contract work.

Many plants who are not normally customers for the used machinery trade are currently in the market for used equipment; this development was caused by extended deliveries on new machines.

Buyers Fan Out—In search of good used equipment for the growing tank and aircraft production programs, buyers are scouring the country. Some buyers from Texas ranged as far as the Cleveland market last week, trying to pick up a few machines.

Manpower Woes Cited—As is happening quite generally in all industry, the increasing shortage of manpower has hit the machinery rebuilders. The rebuilding program of at least one major machine tool builder has been knocked out of the picture. Indications are that this condition will soon be seen affecting rebuilders in oher parts of the country.

As a result, dealers who are presently offering a rebuilding service and expect that they can maintain it are preparing for an avalanche of business in the near future. However, they are faced with higher labor costs and an uncertain supply of spare parts.

Quick Turnover—A number of dealers report that they are turning over their complete inventories every 90 days, with the demand highest on such items as automatics and production machines. Dealers have begun paying "finders' fees" for information leading to good used machines, reversing the situation of a year ago, when they were paying these finders' fees for a tip on a prospect that led to a sale. Procurement may be less difficult when the defense program gains more momentum. Many dealers feel that companies will release quite a few machines to the used market, once they determine exactly what their needs will be.

No Time Out—Many dealers are working seven days a week to even maintain present schedules. One dealer reports being two months behind on reconditioning machines for shipment. Despite shortages, indications are that business will continue good for the balance of the year.

Prices Zoom Upward — Prices reported from the Cleveland area are almost fantastic. This is particularly true of machines that were built since 1940. Such items are practically non-existent in the used machinery market. In one instance, a machine that a dealer sold for $2,250 about three months ago is bringing $2,850 or more today.

Presses, press brakes and shears are frequently bringing the original sale price and sometimes more. The general run of good used machine tools will bring close to what they cost when purchased seven or eight years ago. From all indications, this trend will be toward even higher figures.